

The Official **ZENITH** /Heath Computer Users Magazine

REMark®

August 1989

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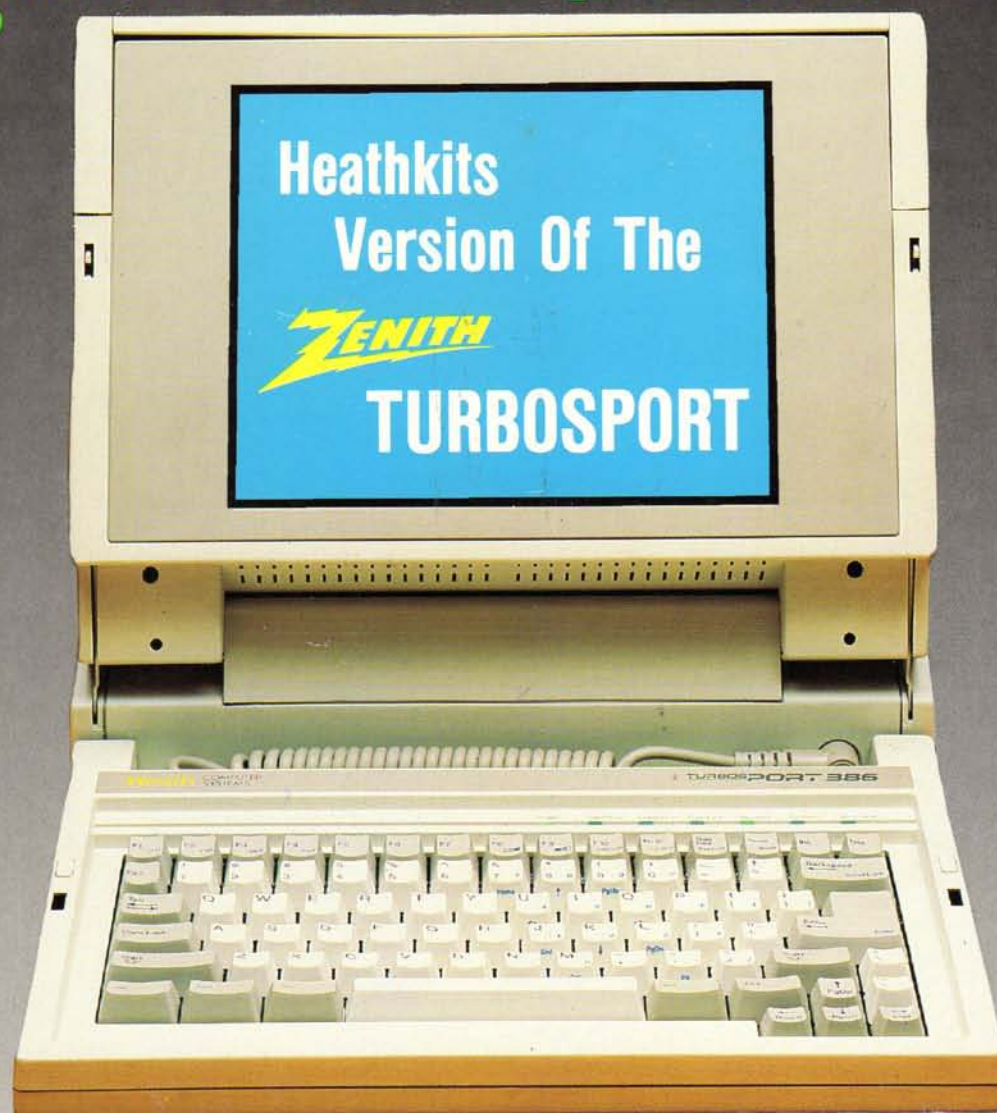
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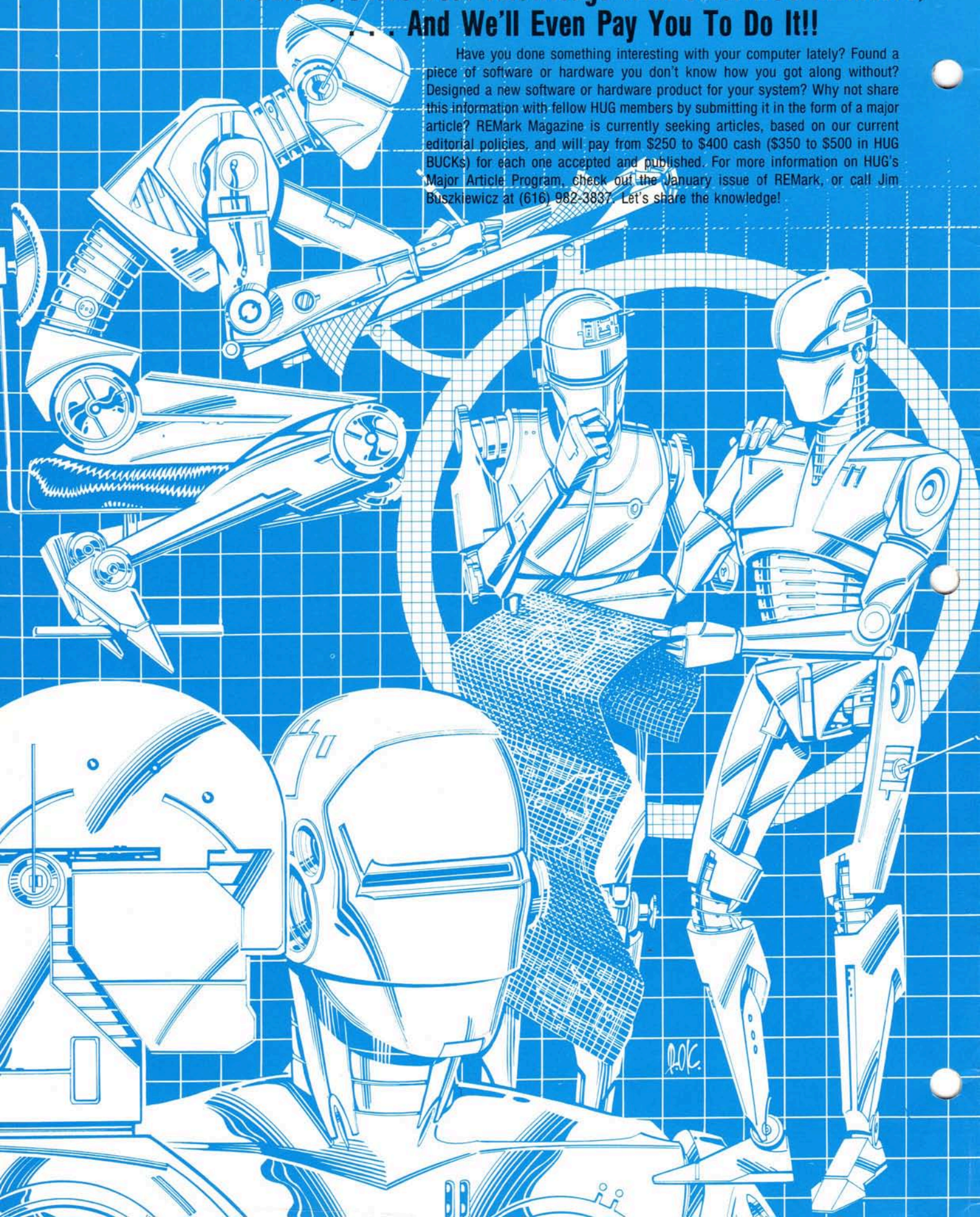
What Makes a Zenith Computer So Special

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Authors, Share Your Knowledge With Other HUG Members, And We'll Even Pay You To Do It!!

Have you done something interesting with your computer lately? Found a piece of software or hardware you don't know how you got along without? Designed a new software or hardware product for your system? Why not share this information with fellow HUG members by submitting it in the form of a major article? REMark Magazine is currently seeking articles, based on our current editorial policies, and will pay from \$250 to \$400 cash (\$350 to \$500 in HUG BUCKS) for each one accepted and published. For more information on HUG's Major Article Program, check out the January issue of REMark, or call Jim Buszkiewicz at (616) 962-3837. Let's share the knowledge!



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WANTED:

Quality Assurance Engineer

The Zenith Computer Group is continuing to experience unprecedented growth. We currently are seeking a Quality Assurance Engineer with a BSCE degree and strong background with assembly code or "C" on Zenith machines. A BSCS with strong hardware background will be considered.

For immediate consideration, send your resume to: Ms. Pat Kauffman, Zenith Computer Group, Hilltop Road, St. Joseph, MI 49085. The Zenith Computer Group is a group of wholly-owned subsidiaries of Zenith Electronics Corporation. An Affirmative Action Employer.

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*U.S. Funds

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HUG

PRODUCT NAME	PART NUMBER	OPERATING		PRICE
		SYSTEM	DESCRIPTION	
H8 - H/Z-89/90				
ACCOUNTING SYSTEM	885-8047-37	CPM	BUSINESS	20.00
ACTION GAMES	885-1220-37	CPM	GAME	20.00
ADVENTURE	885-1010	HDOS	GAME	10.00
ASCIRITY	885-1238-37	CPM	AMATEUR RADIO	20.00
AUTOFILE (Z80 ONLY)	885-1110	HDOS	DBMS	30.00
BHBASIC SUPPORT PACKAGE	885-1119-37	HDOS	UTILITY	20.00
CASTLE	885-8032-37	HDOS	ENTERTAINMENT	20.00
CHEAPCALC	885-1131-37	HDOS	SPREADSHEET	20.00
CHECKOFF	885-8010	HDOS	CHECKBOOK SOFTWARE	25.00
DEVICE DRIVERS	885-1105	HDOS	UTILITY	20.00
DISK UTILITIES	885-1213-37	CPM	UTILITY	20.00
DUNGEONS & DRAGONS	885-1093-37	HDOS	GAME	20.00
FLOATING POINT PACKAGE	885-1063	HDOS	UTILITY	18.00
GALACTIC WARRIORS	885-8009-37	HDOS	GAME	20.00
GALACTIC WARRIORS	885-8009-37	CPM	GAME	20.00
GAMES 1	885-1029-37	HDOS	GAMES	18.00
HARD SECTOR SUPPORT PACKAGE	885-1121	HDOS	UTILITY	30.00
HDOS PROGRAMMERS HELPER	885-8017	HDOS	UTILITY	16.00
HOME FINANCE	885-1070	HDOS	BUSINESS	18.00
HUG DISK DUPLICATION UTILITIES	885-1217-37	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG	885-4500	VARIOUS	PRODUCTS THRU 1982	9.75
HUGMAN & MOVIE ANIMATION	885-1124	HDOS	ENTERTAINMENT	20.00
INFO. SYSTEM AND TEL. & MAIL SYSTEM	885-1108-37	HDOS	DBMS	30.00
LOGBOOK	885-1107-37	HDOS	AMATEUR RADIO	30.00
MAGBASE	885-1249-37	CPM	MAGAZINE DATABASE	25.00
MAPLE	885-8005	HDOS	COMMUNICATION	35.00
MAPLE	885-8012-37	CPM	COMMUNICATION	35.00
MICRONET CONNECTION	885-1122-37	HDOS	COMMUNICATION	16.00
MISCELLANEOUS UTILITIES	885-1089-37	HDOS	UTILITY	20.00
MORSE CODE TRANSCIVER	885-8016	HDOS	AMATEUR RADIO	20.00
MORSE CODE TRANSCIVER	885-8031-37	CPM	AMATEUR RADIO	20.00
PAGE EDITOR	885-1079-37	HDOS	UTILITY	25.00
PROGRAMS FOR PRINTERS	885-1082	HDOS	UTILITY	20.00
REMARK VOL 1 ISSUES 1-13	885-4001	N/A	1978 TO DECEMBER 1980	20.00
RUNOFF	885-1025	HDOS	TEXT PROCESSOR	35.00
SCICALC	885-8027	HDOS	UTILITY	20.00
SMALL BUSINESS PACKAGE	885-1071-37	HDOS	BUSINESS	75.00
SMALL-C COMPILER	885-1134	HDOS	LANGUAGE	30.00
SOFT SECTOR SUPPORT PACKAGE	885-1127-37	HDOS	UTILITY	20.00
STUDENT'S STATISTICS PACKAGE	885-8021	HDOS	EDUCATION	20.00
SUBMIT (Z80 ONLY)	885-8006	HDOS	UTILITY	20.00
TERM & HTOC	885-1207-37	CPM	COMMUNICATION & UTILITY	20.00
TINY BASIC COMPILER	885-1132-37	HDOS	LANGUAGE	25.00
TINY PASCAL	885-1086-37	HDOS	LANGUAGE	20.00
UDUMP	885-8004	HDOS	UTILITY	35.00
UTILITIES	885-1212-37	CPM	UTILITY	20.00
UTILITIES BY PS	885-1126	HDOS	UTILITY	20.00
VARIETY PACKAGE	885-1135-37	HDOS	UTILITY & GAMES	20.00
WHEW UTILITIES	885-1120-37	HDOS	UTILITY	20.00
XMET ROBOT X-ASSEMBLER	885-1229-37	CPM	UTILITY	20.00
Z80 ASSEMBLER	885-1078-37	HDOS	UTILITY	25.00
Z80 DEBUGGING TOOL (ALDT)	885-1116	HDOS	UTILITY	20.00

H8 - H/Z-89/90 - H/Z-100 (Not PC)

ADVENTURE	885-1222-37	CPM	GAME	10.00
BASIC-E	885-1215-37	CPM	LANGUAGE	20.00
CASSINO GAMES	885-1227-37	CPM	GAME	20.00
CHEAPCALC	885-1233-37	CPM	SPREADSHEET	20.00
CHECKOFF	885-8011-37	CPM	CHECKBOOK SOFTWARE	25.00
COPYDOS	885-1235-37	CPM	UTILITY	20.00
DISK DUMP & EDIT UTILITY	885-1225-37	CPM	UTILITY	30.00
DUNGEONS & DRAGONS	885-1209-37	CPM	GAMES	20.00
FAST ACTION GAMES	885-1228-37	CPM	GAME	20.00
FUN DISK I	885-1236-37	CPM	GAMES	20.00
FUN DISK II	885-1248-37	CPM	GAMES	35.00
GAMES DISK	885-1206-37	CPM	GAMES	20.00
GRADE	885-8036-37	CPM	GRADE BOOK	20.00
HRUN	885-1223-37	CPM	HDOS EMULATOR	40.00
HUG FILE MANAGER & UTILITIES	885-1246-37	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PRODUCTS 1983 THRU 1985	9.75
KEYMAP CPM-80	885-1230-37	CPM	UTILITY	20.00
MBASIC PAYROLL	885-1218-37	CPM	BUSINESS	60.00
MICRONET CONNECTION	885-1224-37	CPM	COMMUNICATION	16.00
NAVPROGSEVEN	885-1219-37	CPM	FLIGHT UTILITY	20.00
REMARK VOL 3 ISSUES 24-35	885-4003	N/A	1982	20.00
REMARK VOL 4 ISSUES 36-47	885-4004	N/A	1983	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00
SEA BATTLE	885-1211-37	CPM	GAME	20.00
UTILITIES BY PS	885-1226-37	CPM	UTILITY	20.00
UTILITIES	885-1237-37	CPM	UTILITY	20.00

Price List

PRODUCT NAME	PART NUMBER	OPERATING SYSTEM	DESCRIPTION	PRICE
X-REFERENCE UTILITIES FOR MBASIC	885-1231-[37]	CPM	UTILITY	20.00
ZTERM	885-3003-[37]	CPM	COMMUNICATION	20.00
H/Z-100 (Not PC) Only				
ACCOUNTING SYSTEM	885-8048-37	MSDOS	BUSINESS	20.00
CALC	885-8043-37	MSDOS	UTILITY	20.00
CARDCAT	885-3021-37	MSDOS	BUSINESS	20.00
CHEAPCALC	885-3006-37	MSDOS	SPREADSHEET	20.00
CHECKBOOK MANAGER	885-3013-37	MSDOS	BUSINESS	20.00
CP/EMULATOR	885-3007-37	MSDOS	CPM EMULATOR	20.00
DBZ	885-8034-37	MSDOS	DBMS	25.00
ETCHDUMP	885-3005-37	MSDOS	UTILITY	20.00
EZPLOT II	885-3049-37	MSDOS	PRINTER PLOTTING UTILITY	25.00
GAMES CONTEST PACKAGE	885-3017-37	MSDOS	GAMES	25.00
GAMES PACKAGE II	885-3044-37	MSDOS	GAMES	25.00
GRAPHICS	885-3031-37	MSDOS	ENTERTAINMENT	20.00
HELPSCREEN	885-3039-37	MSDOS	UTILITY	20.00
HUG BACKGROUND PRINT SPOOLER	885-1247-37	CPM	UTILITY	20.00
KEYMAC	885-3046-37	MSDOS	UTILITY	20.00
KEYMAP	885-3010-37	MSDOS	UTILITY	20.00
KEYMAP CPM-85	885-1245-37	CPM	UTILITY	20.00
MAPLE	885-8023-37	CPM	COMMUNICATION	35.00
MATHFLASH	885-8030-37	MSDOS	EDUCATION	20.00
ORBITS	885-8041-37	MSDOS	EDUCATION	25.00
POKER PARTY	885-8042-37	MSDOS	ENTERTAINMENT	20.00
SCICALC	885-8028-37	MSDOS	UTILITY	20.00
SKYVIEWS	885-3015-37	MSDOS	ASTRONOMY UTILITY	20.00
SMALL-C COMPILER	885-3026-37	MSDOS	LANGUAGE	30.00
SPELLS	885-3035-37	MSDOS	SPELLING CHECKER	20.00
SPREADSHEET CONTEST PACKAGE	885-3018-37	MSDOS	VARIOUS SPREADSHEETS	25.00
TREE-ID	885-3036-37	MSDOS	TREE IDENTIFIER	20.00
USEFUL PROGRAMS I	885-3022-37	MSDOS	UTILITIES	30.00
UTILITIES	885-3008-37	MSDOS	UTILITY	20.00
ZBASIC DUNGEONS & DRAGONS	885-3009-37	MSDOS	GAME	20.00
ZBASIC GRAPHIC GAMES	885-3004-37	MSDOS	GAMES	20.00
ZBASIC GAMES	885-3011-37	MSDOS	GAMES	20.00
ZPC II	885-3037-37	MSDOS	PC EMULATOR	60.00
ZPC UPGRADE DISK	885-3042-37	MSDOS	UTILITY	20.00

H/Z-100 and PC Compatibles

ADVENTURE	885-3016	MSDOS	GAME	10.00
ASSEMBLY LANGUAGE UTILITIES	885-8046	MSDOS	UTILITY	20.00
BOTH SIDES PRINTER UTILITY	885-3048	MSDOS	UTILITY	20.00
CXREF	885-3051	MSDOS	UTILITY	17.00
DEBUG SUPPORT UTILITIES	885-3038	MSDOS	UTILITY	20.00
DPATH	885-8039	MSDOS	UTILITY	20.00
HADES	885-3040	MSDOS	UTILITY	40.00
HELP	885-8040	MSDOS	CAI	25.00
HEPCAT	885-3045	MSDOS	UTILITY	35.00
HUG BACKGROUND PRINT SPOOLER	885-3029	MSDOS	UTILITY	20.00
HUG EDITOR	885-3012	MSDOS	TEXT PROCESSOR	20.00
HUG MENU SYSTEM	885-3020	MSDOS	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PROD 1983 THRU 1985	9.75
HUGMCP	885-3033	MSDOS	COMMUNICATION	40.00
HUGPBB SOURCE LISTING	885-3028	MSDOS	COMMUNICATION	60.00
HUGPBB	885-3027	MSDOS	COMMUNICATION	40.00
ICT 8080 TO 8088 TRANSLATOR	885-3024	MSDOS	UTILITY	20.00
MAGBASE	885-3050	VARIOUS	MAGAZINE DATABASE	25.00
MATT	885-8045	MSDOS	MATRIX UTILITY	20.00
MISCELLANEOUS UTILITIES	885-3025	MSDOS	UTILITIES	20.00
PS's PC & Z100 UTILITIES	885-3052	MSDOS	UTILITY	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00
REMARK VOL 8 ISSUES 84-95	885-4008	N/A	1987	25.00
SCREEN DUMP	885-3043	MSDOS	UTILITY	30.00
UTILITIES II	885-3014	MSDOS	UTILITY	20.00
Z100 WORDSTAR CONNECTION	885-3047	MSDOS	UTILITY	20.00

PC Compatibles

ACCOUNTING SYSTEM	885-8049	MSDOS	BUSINESS	20.00
CARDCAT	885-6006	MSDOS	CATALOGING SYSTEM	20.00
CHEAPCALC	885-6004	MSDOS	SPREADSHEET	20.00
CP/EMULATOR II & ZEMULATOR	885-6002	MSDOS	CPM & Z100 EMULATORS	20.00
DUNGEONS & DRAGONS	885-6007	MSDOS	GAME	20.00
EZPLOT II	885-6013	MSDOS	PRINTER PLOTTING UTILITY	25.00
GRADE	885-8037	MSDOS	GRADE BOOK	20.00
HAM HELP	885-6010	MSDOS	AMATEUR RADIO	20.00
KEYMAP	885-6001	MSDOS	UTILITY	20.00
PS's PC UTILITIES	885-6011	MSDOS	UTILITIES	20.00
POWERING UP	885-4604	N/A	GUIDE TO USING PCS	12.00
SCREEN SAVER PLUS	885-6009	MSDOS	UTILITIES	20.00
SKYVIEWS	885-6005	MSDOS	ASTRONOMY UTILITY	20.00
TCSPELL	885-8044	MSDOS	SPELLING CHECKER	20.00
ULTRA RTTY	885-6012	MSDOS	AMATEUR RADIO	20.00

The following HUG Price List contains a list of all products in the HUG Software Catalog and Software Catalog Update #1. For a detailed abstract of these products, refer to the HUG Software Catalog, Software Catalog Update #1, or previous issues of REMark.

Magazines everywhere, and no way to reference the wealth of information they hold? Not anymore! Now there's **MAGBASE**; a database designed specifically for referencing magazine articles. Don't let those one-hundred-and-some back issues of REMark, or C Users Journal, or Veterinary Medicine, (or any magazine) gather dust, use **MAGBASE**, and find that article you read two years ago! **MAGBASE** is available for **MSDOS HUG P/N 885-3050** or **CP/M (P/N 885-1249-[27])**.

LAPTOP OWNERS . . . don't feel left out! All of HUG's MSDOS software is available on 3-1/2" micro-floppies too! When ordering, just add a "-80" to the 7-digit HUG part number. For the standard 5-1/4" floppy, just add a "-37".

Make the no-hassle connection with your modem today! **HUGMCP** doesn't give you long menus to sift through like some modem packages do. With **HUGMCP**, YOU'RE always in control, not the software. Order **HUG P/N 885-3033-37** today, and see if it isn't the easiest-to-use modem software available. They say it's so easy to use, they didn't even need to look at the manual. "It's the only modem software that I use, and I'm in charge of the HUG bulletin board!" says Jim Buszkiewicz. **HUGMCP** runs on ANY Heath/Zenith computer that's capable of running MS-DOS!

ORDERING INFORMATION

For VISA and MasterCard phone orders, telephone the Heath Users' Group directly at (616) 982-3463. Have the part number(s), descriptions, and quantity ready for quick processing. By mail, send your order, plus 10% postage and handling (\$1.00 minimum charge, up to a maximum of \$5.00) to: Heath Users' Group, P.O. Box 217, Benton Harbor, MI 49022-0217. VISA and MasterCard require minimum \$10.00 order. No C.O.D.s accepted.

Questions regarding your subscription? Call Margaret Bacon at (616) 982-3463.



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Call TOLL-FREE Today!

(Prices good from July 1 through October 1, 1989)

1-800-253-0570

Use order code 217-063

MODEL NUMBER	PRODUCT DESCRIPTION	OLD PRICE	SALE PRICE
A-200	CA DATA DISPLAY	\$1,199.00	\$699.00
AA-3000	MIG ABILITY PLUS 1.0	\$259.95	\$99.00
AAW-2500	ASSEMBLED 100W STEREO POWER AMPLIFIER	\$499.00	\$399.00
AA-2500	KIT 100W STEREO POWER AMPLIFIER	\$449.00	\$359.00
AB-3000	MIG ABILITY 1.2	\$99.95	\$49.00
ACW-2540	ASSEMBLED STEREO CASSETTE DECK	\$349.00	\$279.00
ADW-2530	ASSEMBLED COMPACT DISC PLAYER	\$349.00	\$279.00
AE-2501	STEREO EQUIPMENT CABINET	\$189.95	\$149.00
AJW-2520	ASSEMBLED AM/FM DIGITAL STEREO TUNER	\$249.00	\$199.00
AJ-2520	KIT AM/FM DIGITAL STEREO TUNER	\$229.00	\$180.00
AMA-1	FUNDAMENTALS OF FINANCE LEARNING PROGRAM	\$100.00	\$60.00
AMA-2	ASSERTIVENESS TRAINING PROGRAM	\$100.00	\$60.00
AMA-3	TECHNICAL REPORTS LEARNING PROGRAM	\$100.00	\$60.00
AMA-4	PROJECT MANAGEMENT LEARNING PROGRAM	\$130.00	\$75.00
APW-2510	ASSEMBLED AUDIOPHILE STEREO PREAMPLIFIER	\$399.00	\$319.00
AP-2510	KIT AUDIOPHILE STEREO PREAMPLIFIER	\$349.00	\$279.00
ARA-355-1	EV DYNAMIC CARDIOD MICROPHONE	\$69.95	\$49.95
ARA-355-2	ALL-WEATHER COLUMN SPEAKER	\$149.95	\$99.95
ARA-355-3	8' CEILING LINE SPEAKER W/BAFFEL	\$29.97	\$12.95
AR-355	35W PA MIXER AND RECEIVER	\$299.95	\$199.00
ASW-1082	ASSEMBLED 2-WAY BOOKSHELF STEREO SPEAKER	\$159.95	\$119.00
ASW-1230	ASSEM. 3-WY FLOOR STANDING STEREO SPEAKR	\$399.00	\$309.00
AS-1082	KIT JBL 2-WAY BOOKSHELF SPEAKER	\$129.95	\$99.00
AS-1230	KIT 3-WAY FLOOR STANDING STEREO SPEAKER	\$349.00	\$259.00
BC-100X-LT	100 Ch 11 Band Hand Scanner	\$219.95	\$174.88

MODEL NUMBER	PRODUCT DESCRIPTION	OLD PRICE	SALE PRICE
BC-175X-L	16 Ch 11 Band Scanner	\$169.95	\$144.88
BC-227	X-10 WALL RECEPTACLE MODULE	\$19.99	\$14.99
BC-2458	remote open door indicator for BC-6000-1	\$24.99	\$13.99
BC-2481	extra remote transmitter for BC-6000-1	\$34.99	\$19.99
BC-2700	X-10 TELEPHONE RESPONDER	\$49.95	\$29.95
BC-2807	X-10 THERMOSTAT CONTROLLER	\$19.99	\$12.99
BC-284	X-10 BURGLAR ALARM	\$39.99	\$29.95
BC-55-XLT	10 Ch 10 Band Hand Scanner	\$134.95	\$104.88
BC-580X-LT	100 Ch 11 Band Base/Mobile Scanner	\$249.95	\$178.88
BC-6000-1	Stanley garage door opener	\$189.95	\$139.95
BC-760X-LT	100Ch 12Band Base/Mobile Scanner	\$319.95	\$234.88
BH-110	DIGITAL FEVER THERMOMETER	\$9.95	\$4.95
BH-1735	BLOOD PRESSURE METER	\$49.95	\$34.95
BH-1750	BLOOD PRESSURE METER WITH PRINTER	\$99.95	\$79.95
BH-2200	DIGITAL SCALE	\$39.95	\$19.95
BH-8500	DIGITAL SCALE W/INFRA-RED REMOTE	\$59.95	\$39.95
BP-1234	NI-CAD BATTERY CHARGER	\$21.99	\$17.95
BW-400	PC Wx Card	\$399.95	\$299.95
CGW-1562	AUTOMOTIVE G-METER	\$39.95	\$36.95
CI-2065	AUTO CHARGING SYSTEM TESTER	\$24.95	\$19.95
DC -1000	DG DOUBLECOM	\$149.95	\$99.00
EA-100	MICROPROCESSOR TRAINER ACCESSORY BOARD	\$750.00	\$100.00
EB-1010	ELECTRONICS LEARNING DICTIONARY	\$15.00	\$5.00
EB-1030	ELECTRONICS READY REFERENCE GUIDE	\$15.00	\$6.00
EC-1126	ARTIFICIAL INTELLIGENCE COURSE	\$70.00	\$40.00
EC-1127	TI ARTIFICIAL INTELLIGENCE SOFTWARE	\$500.00	\$150.00
EC-1305	AUTOCAD BASIC FOR Z-100	\$300.00	\$75.00
EC-1305-PC	AUTOCAD BASIC FOR PC'S	\$300.00	\$75.00
EC-1307-PC	AUTOCAD WITH ADE 1 & 2	\$1,400.00	\$400.00
EC-1310-PC	AUTOCAD AUTO SKETCH FOR PC'S	\$79.95	\$30.00
EE-1002	TRANSISTOR CIRCUIT DESIGN COURSE	\$44.95	\$29.00
EE-1900	INTELLIGENT MACHINES COURSE	\$70.00	\$25.00
EE-1901	ELECTRONICS FOR AUTOMATION COURSE	\$100.00	\$50.00
EE-1903	INDUSTRIAL ROBOTICS & AUTOMATION COURSE	\$80.00	\$50.00
EE-3140-A	CONCEPTS OF ELECTRONICS COURSE	\$55.00	\$40.00
EE-3820	6811 MICROPROCESSOR PROGRAMMING COURSE	\$100.00	\$60.00
EW -2000	MIG ENRICH 1.2	\$199.95	\$49.00
ETA-3600-1	BREADBOARDING BLOCK ACCESSORY	\$20.00	\$10.00
ETB-3300	BREADBOARD MODULE FOR BACKPACK ACCESSORY	\$100.00	\$40.00
ETB-6060	WIRE WRAP MODULE FOR BACKPACK ACCESSORY	\$40.00	\$25.00
ETB-6104	ELECTRONICS CIRCUITS BACKPACK BOARD	\$200.00	\$100.00
ETS-18-C	HERO I ROBOT WITHOUT ARM (KIT)	\$1,099.00	\$795.00
ETS-19-32	STANDALONE ROBOT ARM WITH BASE (KIT)	\$999.00	\$695.00
ETS-19-D	HERO 2000 ROBOT SYSTEM (KIT)	\$2,995.00	\$1,500.00
ETW-19-31	HERO 2000 CASSETTE INTERFACE	\$100.00	\$30.00
ETW-3200-B	DIGITAL TRAINER (WIRED)	\$200.00	\$50.00
ETW-3300-B	LABORATORY BREADBOARD TRAINER (WIRED)	\$194.00	\$100.00
ETW-3567	TRAINER BACKPACK ACCESSORY (WIRED)	\$200.00	\$130.00
ET-3567	TRAINER BACKPACK ACCESSORY (KIT)	\$130.00	\$100.00
EVM-2015-A	12" AMBER MONITOR	\$160.00	\$75.00
EWS-100-D	16-BIT MICROPROCESSOR TRAINING SYSTEM	\$1,599.00	\$999.00
EWS-100-E	ADVANCED MICRO TRAINER/ACCESSORY BOARD	NONE	\$599.00
EWS-18-A	HERO I ROBOT WITH ARM (WIRED)	NONE	\$1,495.00
EWS-19-32	STANDALONE ROBOT ARM WITH BASE (WIRED)	\$1,995.00	\$1,295.00
GDA-3196-1	16' X 20' FURNACE FILTER FOR GD-3196	\$99.95	\$74.95

MODEL NUMBER	PRODUCT DESCRIPTION	OLD PRICE	SALE PRICE
GDA-3196-2	16' X 25' FURNACE FILTER FOR GD-3196	\$99.95	\$74.95
GDA-3196-3	20' X 20' FURNACE FILTER FOR GD-3196	\$99.95	\$74.95
GDA-3196-4	20' X 25' FURNACE FILTER FOR GD-3196	\$99.95	\$74.95
GDP-1108	WELLER TEMP-CONTROLLED SOLDERING STATION	\$89.95	\$79.95
GDP-1109	REPLACEMENT TIPS FOR WELLER SOLD. STATION	\$17.95	\$12.95
GDP-3100	UNGAR IRON REPLACEMENT TIPS	\$8.95	\$6.95
GDP-3125	25W UNGAR SOLDERING IRON	\$12.95	\$8.95
GDP-3140	40W UNGAR SOLDERING IRON	\$17.95	\$9.95
GDS-1297	PORTABLE AIR CLEANER	\$249.95	\$179.00
GDZ-143	ZENITH UNIVERSAL REMOTE CONTROL	\$49.95	\$29.95
GD-1151-H	KIT ULTRASONIC CLEANER	\$99.95	\$79.95
GD-1701	KIT FLOOD ALARM	\$24.95	\$12.95
GD-3196	KIT FURNACE AIR CLEANER	\$149.95	\$79.95
GD-3610	heat actuated outdoor light controller	\$69.95	\$29.95
GHP-1270	WELLER ELECTRONIC TOOL KIT W/CASE	\$42.95	\$34.36
GRA-2035-1	TV/VCR VIDEO CENTER	\$79.95	\$55.97
GR-4500	45' SUPER SCREEN TELEVISION KIT	\$1,295.00	\$999.00
HBT-40-1	40 Mbyte tape cartridge, HBT-40 series	\$24.95	\$19.95
HBT-40-AT	internal 40 Mbyte back-up tape drive	\$389.95	\$299.95
HBT-40-H4	external adapter for HBT-40, H-40 series	\$199.95	\$149.95
HBT-40-HZ	external adapter for HBT-40, Heat/Zenith	\$199.95	\$149.95
HBT-40-SD	external adapter for HBT-40, IBM	\$139.95	\$99.95
HBT-40-XT	internal 40 Mbyte back-up tape drive	\$379.95	\$289.95
HCA-9	PRINT STAND FOR H-25	\$49.00	\$25.00
HCA-3000	co-ax connector/adaptor kit	\$69.95	\$69.95
HDP-1472	2 METER MAG ANTENNA	\$29.95	\$19.95
HDP-1474	2 METER GLASS ANTENNA	\$42.95	\$32.95
HDP-7800	SWL TRAP ANTENNA	\$64.95	\$48.88
HD-1274	117 VAC 12 outlet power strip kit	\$19.99	\$17.95
HD-4040	TNC-1	\$114.88	\$114.88
HP2-2706-B	HPDJ FONT: PRESTIGE	\$95.00	\$59.00
HP2-2706-P	HPDJ FONT: TMS/RMN	\$125.00	\$79.00
HP2-2707-E	HPDJ FONT: EPSON FX80	\$75.00	\$49.00
HP8-8390-B	HP MAC INTF: SCANJET	\$595.00	\$299.00
HSM-100	spreadsheet, word proc, database, 5 1/4"	\$100.00	\$37.99
HSM-100-3	spreadsheet, word proc, database, 3 1/2"	\$99.95	\$37.99
HS-2526-A & HWD-20-AT	286/12, large case, w/20 Mbyte, kit	\$2,138.00	\$1,949.00
HS-2526-A & HWD-4028	286/12, large case, w/40 Mbyte, kit	\$2,558.00	\$2,249.00
HS-3860	386/12 laptop w/40 Mbyte, kit	\$4,999.00	\$4,369.00
HS-3860-M	386/12 laptop w/40 Mbyte, modem, kit	\$5,249.00	\$4,589.00
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HS-40-A & HWD-420	286/8, mini case, 20 Mbyte, kit	\$2,138.00	\$1,849.00
HS-40-A & HWD-440	286/8, mini case, 40 Mbyte, kit	\$2,298.00	\$1,999.00
HS-42 & HWD-420	286/12, mini case, 20 Mbyte	\$2,338.00	\$2,049.00
HS-42 & HWS-440	286/12, mini case, 40 Mbyte	\$2,498.00	\$2,149.00
HWD-20	20 Mbyte disk & controller for XT	\$299.00	\$269.00
IDS-4801	EPROM programmer system	\$279.00	\$179.00
ID-4804	byte probe	\$29.95	\$24.95
IHO-2201	IN-HOUSE ACCOUNTANT	\$99.99	\$49.00
IM-2203	line voltage monitor kit	\$39.00	\$29.95
IM-2260	3 1/2 digit bench DMM kit	\$139.95	\$119.95
IM-5217	VOM with rugged case	\$39.95	\$39.95
IN-6000	MIG IN-HOUSE ACCT 2.1	\$199.95	\$49.00
LM-2000	80,000 word dictionary, plus thesaurus	\$159.95	\$99.95

MODEL NUMBER	PRODUCT DESCRIPTION	OLD PRICE	SALE PRICE
LU-500	video transeiver for telephones	\$289.95	\$179.95
MD-550-1	VERBATIM 5" STD DISKS	\$9.99	\$6.00
MD-600	VERBATIM 5" HD DISKS	\$19.99	\$11.00
MF-360	VERBATIM 3.5" DISKS	\$19.99	\$11.00
MIA-2020-1	Transom Transducer	\$54.95	\$49.95
MIA-2020-2	Thru hull Transducer	\$129.95	\$99.95
MI-2020	20/20 Video Fish Finder	\$265.00	\$199.95
MI-2040	Color Video Fish Finder	\$445.00	\$299.95
MM-5	AMARAY MEDIAMATE 5	\$12.99	\$6.00
MM-5-XL	AMARAY MEDIAMATE 5XL	\$24.99	\$9.95
MO-5500	MIG POCKET MODEM IBM	\$159.95	\$99.00
MO-7500	MIG POCKET MODEM MAC	\$149.95	\$99.00
MP-4	AMARAY MEDIAPACK 4	\$11.99	\$6.00
NE-2112	KIT HEAT SNIFFER	\$19.95	\$14.95
PA-430	MICROSOFT BOOKSHELF	\$349.95	\$149.00
PC-122	INTEL ABOVEBOARD PS	\$220.00	\$50.00
PC-131	USR PCM-5 MODEM (PC)	\$205.00	\$79.00
PC-132	ZOOM MODEM PC-1200XL	\$199.95	\$99.00
PC-136	ZOOM PC2400XL MODEM	\$349.95	\$129.00
PC-146	INTEL ABOVE BOARD	\$199.00	\$199.95
PCS-110	DG ANAL. PORT & CLOCK	\$79.95	\$49.00
PD-500	CAM VOICEMAIL	\$349.99	\$229.00
PD-510	CPC FAX BOARD	\$499.00	\$249.00
PD-520	CPC HAND SCANNER	\$249.95	\$149.00
PD-2424	2400B EXTERNAL MODEM	\$199.95	\$129.00
PF-132	BUSH MONITOR PLATFORM	\$17.95	\$9.00
PF-156	NEW GENERATION PRNTR STAND	\$49.00	\$39.00
PF-157	NEW GENERATION 2-DRWR CAB	\$59.00	\$55.00
PF-161	ARTISAN HUTCH	\$120.00	\$49.00
PF-167	ARTISAN FILE DRAWER	\$69.00	\$49.00
PI-23	KRAFT MICROMOUSE	\$69.99	\$39.00
PI-5000-1	AMDEK CD ROM	\$999.00	\$599.00
RK-3-A	rf probe for oscilloscopes, kit	\$9.95	\$4.95
PM-100	DISKETTE TRAY	\$19.99	\$12.00
PM-125	RS 232 M/M GENDER CNGR	\$11.99	\$7.00
PM-126	RS 232 F/F GENDER CNGR	\$11.99	\$7.00
PM-160	HYPERACCESS SFTWARE PK	\$149.00	\$79.00
PM-160-3	HYPERACCESS 3.23 3.5"	\$149.95	\$79.00
PM-162	HYPER/ACCESS: 2-100	\$149.95	\$39.00
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PM-2100	KEN MASTERPIECE	\$129.95	\$79.00
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PM-3269	ICI FLIP SORT 5.25"	\$7.95	\$5.00
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PO-310	SYQUEST CART: 10MB	\$139.95	\$99.00
PP-105	C. ITOH PROWRITER JR.	\$189.00	\$149.00
PP-111	SAFT 200VA SPS	\$199.00	\$199.00
PP-115	SAFT SPS0400 350W UPS	\$549.95	\$319.00
PP-221	EPSON LX-86	\$199.00	\$149.00
PP-230	EPSON PRINT RX-100	\$329.00	\$99.00

MODEL NUMBER	PRODUCT DESCRIPTION	OLD PRICE	SALE PRICE
PP-243	EPSON LQ-1000	\$999.95	\$599.00
PP-256	EPSON EX-800	\$699.00	\$449.00
PP-400	KOALAPAD TOUCH TABLET	\$69.95	\$20.00
PP-511	IOMEGA A210H 10M/2DR	\$2,799.00	\$500.00
PP-714	CANON PC-14 COPIER	\$625.00	\$399.00
PP-2239-A	HP RW SHEET FEED	\$250.00	\$149.00
PP-3443	1M RAM BD LASERJET II	\$595.00	\$399.00
PP-3444	2M RAM BD LASERJET II	\$1,195.00	\$699.00
PP-8290	HP PC INTF: SCANJET	\$595.00	\$299.00
PP-9190	HP SCANJET SCANNER	\$1,495.00	\$699.00
PPA-220-2	EPSON LX-80 TRAC. FEED	\$39.95	\$15.00
PPA-243-2	TRACTOR: LQ-1000	\$69.99	\$19.95
PPA-246-1	RIBBON: LQ-800	\$9.00	\$4.95
PPA-246-2	TRACTOR: LQ-800	\$59.99	\$19.95
PPA-400-1	KOA SPEEDKEY SOFTWARE	\$29.95	\$10.00
PR-120	RIBBON LQ-2500	\$9.00	\$4.95
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SE-100	Mr. CIRCUIT 30-IN 1 ELECT. EXPERIMENTER	\$24.95	\$19.96
SE-101	SOLAR POWER 150 EXPERIMENTER LAB	\$29.95	\$23.96
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SK-201	moden surge protector, kit	\$14.95	\$6.97
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SK-203-H	printer buffer--speeds throughput, kit	\$199.95	\$169.95
SK-204	RS-232 cable protocol switch, kit	\$29.95	\$24.95
SK-205	baud rate analyzer	\$49.95	\$27.95
SK-210	RS-232 patch board	\$14.95	\$6.97
SK-99	STARTER KIT CABINET ACCESSORY	\$6.95	\$4.95
SL-5410	HEATH/ZENITH MOTION SENSOR LIGHT CONTROL	\$39.97	\$19.97
SMD-1	SURFACE MOUNT EXPERIMENTER KIT	\$14.95	\$10.95
SMT-1	SURFACE MOUNT TOOL KIT	\$39.95	\$24.95
SM-2440	1.3 GHz counter, deluxe	\$399.95	\$329.95
SO-4251	50 MHz dual trace, d'lyd sweep oscscope	\$749.95	\$689.95
STS-4750	16 CHANNEL LOGIC ANALYZER	\$2,195.00	\$1,500.00
TD-1089	PROGRAMABLE ELECTRONIC DOORBELL	\$49.95	\$35.95
TE-37	TECHMAR GRAPHICS MASTR	\$545.00	\$100.00
TE-200	OPEN-AIR DESIGN STEREO HEADPHONES	\$59.95	\$45.00
TE-400	CLOSED BACK DESIGN STEREO HEADPHONES	\$69.95	\$55.00
TPI-5000	20 coax cables, various connectors	\$49.95	\$49.95
VAC-618	CARRY CASE FOR VM-6180 CAMCORDER	\$49.95	\$24.95
VM-6180	ZENITH VHS-C CAMCORDER	\$849.00	\$749.00
VRE-200	ZENITH 4-HEAD DOUBLE AZMITH MIDI VCR	\$329.00	\$309.00
V-617	PICTURE/VIDEO TRANSFER	\$79.95	\$49.95
WM-1200	pocket speller, synonyms, definitions	\$79.95	\$47.95

FROM THE CPU...

JIM BUSZKIEWICZ

Change in Author Reimbursement Policy

In response to requests from many of REMark's authors, I've decided to make a change in the reimbursement policy of our major article program. The authors of articles received and accepted for publication after August 1, 1989, will be immediately eligible for reimbursement. This means that REMark authors will no longer have to wait for their article to be published before they get paid for their efforts... instant gratification!

For your convenience, the following information is reprinted from the January issue of REMark.

Article Submittals

Major articles are defined as articles containing 2000 words or more. Authors contributing major articles that are printed in REMark will have a choice of receiving one of the following:

- A choice of any single Heath/Zenith software product.
- Cash, ranging in value from \$250 to \$400.
- HUG BUCK certificate ranging in value from \$350 to \$500.

For those of you just joining us, HUG BUCKs are certificates good toward the purchase of **any** product in the Heath mail order catalog. HUG BUCKs can be collected to completely or partially purchase the product of your choice. Specifics regarding the use of the HUG BUCK accompany the award itself.

Those individuals that contribute smaller articles will receive the "Certificate of Recognition and Appreciation" from the Heath/Zenith Users' Group. As you can see, we feel that any information you send us is important.

How to Submit Articles to REMark What Subject?

Feel free to submit article manuscripts on any subject matter that you

think will be of interest to the Heath/Zenith Users' Group community. Tutorial or How-to articles tend to be the most popular. Highly technical articles, although acceptable, do not have a broad readership base.

If you choose what might be considered a highly technical subject, try not to use terms which the average user would not be familiar with. If you should feel the need to use such terms, give a definition. Be kind to those who might not understand your application and explain your special programming tricks with a little extra detail. It's these "tricks" that help others to comprehend programming techniques and to be better programmers themselves.

If you feel that you have a unique program or hardware application, sit down and write about it. Do you have a special program for the bowling team, softball league, maybe a different business or farm program? Possibly, you have interfaced your computer to some special machine to gather data for later evaluation. These are just some of the things other HUGgies are interested in reading about.

The following is only a sample list of possible subjects:

Software:

- Application
- Modification
- New approaches
- File handling
- I/O handling
- Enhancements
- Reviews

Hardware:

- Special applications
(Schools, Business, Handicap, etc.)
- Enhancements
- Interfacing

Problem solving Reviews

Review past issues of REMark. See what subjects have been covered. Try not to cover the same subject unless you have a better or totally different approach. Don't be a "me too" writer, open new doors.

How Big?

To qualify for the "Major Article Program," your manuscript must be 2,000 words or more. Articles in excess of 5,000 words generally need to be broken into installments for separate publication.

Articles of less than 2,000 words and "Buggin' HUG" letters are acceptable. However, this type of submittal does not qualify for HUG reimbursement of a Heath/Zenith software product, cash or HUG BUCKs.

How About Photos?

If a photograph will help explain, include it. Clear, sharply focused, black and white photos reproduce best, but color photos can be used. Include a caption with each photo to help with the explanation. Any photographs become the property of REMark and cannot be returned.

What About Drawings?

If a drawing, like photographs, will help, include it. We request that you provide us with finished India Ink drawings or computer/printer art suitable for reproduction. Should you feel you are not capable of supplying finished artwork, check with a local high school drafting class. Generally, these students are anxious to display their talent. REMark, in some cases, will provide artwork, but this will delay publication of your article.

Is Hardcopy Necessary?

Yes! We request that any submittal include a printout of all files. Also, we

would like to know what you feel your article should look like in print. In some cases, we do not have the processor the author used to duplicate text provided on disk.

Is a Disk Copy Needed?

Yes! REMark uses the latest techniques for the preparation of copy. Submitting your manuscript on disk along

with all pertinent files moves the information through our system faster. We can accept any **standard** Heath/Zenith disk format; however, MS-DOS format is preferred. Your text files should not have visible or hidden coding, since these codes delay the production process. WordStar files, however, are preferred.

Should you have questions about an article you would like to submit, please

feel free to contact the REMark Editor. All materials received for publication in REMark become the property of the Heath/Zenith Users' Group.

Once you have completed your article, send it directly to:

Heath/Zenith Users' Group

Attn: REMark Article

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Reader Service #121

Local Users' Groups, Take Note!

We're coming up on the end of the year, and will be preparing to publish our annual list of local clubs in the January 1989 issue of REMark. This list is going to be updated completely. We're finding too many errors with the current list. **IF YOU WOULD LIKE YOUR CLUB TO BE**

LISTED, YOU MUST SEND IN THE FORM (or a copy of it) LOCATED AT THE BOTTOM OF THIS PAGE! We must receive this form **BEFORE** October 1st, 1989. If we don't get this form, your club will **NOT** be listed. Many times throughout the year, we're asked by users, where is the location of

the nearest local users' group. Not only will this list provide us with that information, but will also help your membership since we will be able to steer that individual to your group!



Local HUG Club Survey

Club Name: _____

Address: _____

City/State/Zip: _____

Voice Phone Number(s): _____

BBS Phone Number(s): _____

Person(s) to Contact: _____

Meeting Times: _____

Meeting Location: _____

Mail a copy of this form or the equivalent information directly to:

HUG

P.O. Box 217

Benton Harbor, MI 49022-0217

BUGGIN' HUG

Q&A from Paul Herman

The following are some questions a Z-100 owner asked, and Paul Herman was kind enough to answer:

Question: The Microsoft Fortran and Pascal compiler manuals say that the 8087 library file must be patched if any of these criteria are met:

- a. The 8087 uses an interrupt vector other than 2.
- b. An 8259 interrupt controller chip is used.
- c. The 8087 shares interrupts with another device.

What does all this mean?

Answer: The criteria that the Microsoft language manuals discuss in reference to 8087 interrupts, refer to the interrupt number generated by the 8087 when an abnormal condition occurs (such as attempted divide by zero), and how the interrupt is handled. The versions of Microsoft Fortran and Pascal you have expect this interrupt to be generated as interrupt 2, which is reserved by Intel for non-maskable interrupts. The UCI Easy-87 board, Zenith's Z-216 8087 kit, and the Gemini Technologies 8087 upgrade, all use interrupt 2, so there shouldn't be any problem.

Interrupt 2 is not a line which is processed by the Z-100's 8259A interrupt controller chip, nor do any other devices normally share this interrupt line, so these exceptions to 8087 use in the Compiler manual may be ignored. In other words, the compiler should work with your 8087 equipped Z-100 without any patches or modifications.

Question: How do I know if the 8087 is working?

Answer: Write a sample program in the language of your choice, making sure that it uses floating point arithmetic. Use looping techniques to make sure the program will take a while to execute. Compile the program using the soft-

ware floating point emulator library (library with no 8087 code), then time the execution of the program with a stopwatch. Now re-compile the program using the 8087 floating point library. The execution time should be noticeably shorter.

Another way to tell if the 8087 is working is by comparing the execution time of a commercial software program which is known to use the 8087 (such as AutoCAD). Time the program on a Z-100 with and without the 8087, to see if there is any difference.

Question: The (S)ystem command of the MTR-100 monitor ROM seems to know about the 8087, but there doesn't seem to be any reference to the 8087 in the ROM listings provided with the Z-100 Technical Manual. Is this ROM listing current? Where is the code for the 8087 check, and how is it done?

Answer: The MTR-100 monitor ROM listing provided as a part of the Z-100 Technical Manual set is definitely not current. As a matter of fact, the ROM version described by the listing is version 1. Many, many new features have been added to the MTR-100 ROM since that listing was printed.

The version of MTR-100 ROM I have (v2.5) doesn't include any reference to the 8087 chip in its routine for the (S)ystem command, so you must have a later version than I do. Since the ROM in my Z-100 doesn't have the code, I can't help you out much on locating it, or telling you how it works . . . sorry.

I hope this information has been a help to you. Keep in touch!

Sincerely,
Paul F. Herman
Software Graphics Tools
3620 Amazon Drive
New Port Richey, FL 34655

Purpose of HUG Questioned

Dear Jim:

Just one more letter for your pile.

Having just received and read my June issue of HUG, I find the comments made by Craig Carver (What's the Purpose of HUG) well taken and to the point. Mr. Carver's comments are accentuated by

the article "Hard Drive and Expanded Memory Support Changed in Zenith MS-DOS 3.3 Plus" by William Adney.

We really do need a forum that is to the Heath/Zenith point. Help, support, and comments on the Heath/Zenith Data Systems equipment is really needed. Between the "Z . . ." operating differences, and the lack of documentation or clearly presented documentation, many of us are left standing in the mud.

I became the owner of a 286 SupersPort last July. I have run up against one confusion after another with this mechanically great unit.

For example, how many readers/users know that the early keyboard controller chips are the cause of the unit going into a low battery shutdown? The three of us here in Panama with the portable knew that if we turned the unit off and back on every time this occurred, we could get the "advertised" operating time out of our batteries.

Who clued us in to a fix? A Heath/Zenith repair center in California. \$23 for the new improved chip, and WOW! I can run for hours without turning the unit on and off.

This morning I was at the Base Exchange computer shop browsing and I overheard a new 286 SupersPort owner trying to figure out why he cannot get higher resolution graphics from the SETUP rom program. Just read the manual. We all know that you need an EGA or VGA card to use a CGA or VGA video option, but why can I not get my new hi-res CGA (640X350) monitor to display choice V M10 at the SETUP prompt? No where in the operators' manual does it hint that the video port will give you only 320X200 RGB.

Well, being a typical computer buttinski, I explained how I banged my head against the CRT for months trying to accomplish the impossible! I finally gave up trying to figure it out and just last week called the Heath computer support line. Normal business hours only, mind you, at \$3.00 per minute from Panama. What was I told? Sorry, 320X200 is it, unless you have an expansion chassis. Mystery solved.

What about using the 2.5 amp-hour battery with the 286 SupersPort? Yep, it works, only 1 to 2 hours, but a lot cheaper than the 4.8 amp-hour 286 battery and a lot lighter.

Confused about EMM.SYS? Extended/expanded memory, just read your manual!??? Then call Heath computer support.

Let's get this stuff, and more, into our REMark. Let's hear about improved ROMs. Let's hear about the little two bit "how to do it" to keep us from going nuts. Keep track of help calls to the com-

Continued on Page 14

*** Z-100 SERIES SOFTWARE ***

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-463-1	Z-Basic (16 bit)	\$175.00	\$12.00
MS-463-7	Multiplan	\$195.00	\$12.00
MS-253-1	Basic-80 (8-bit)	\$175.00	\$12.00
CD-463-2	Condor File Manager	\$299.00	\$12.00
LT-Z100	All 4 Listed Above	\$819.00	\$40.00

*** IBM COMPATIBLE SOFTWARE ***

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-5063-30	Microsoft Windows	\$99.00	\$24.00
NU-413	Norton Utilities Adv.	\$150.00	\$99.00
WP-528	WORDPERFECT 5.0	\$495.00	\$269.00
BO-290	QUATTRO	\$239.00	\$179.00
CP-311	PC TOOLS DELUXE	79.00	\$68.00

*** ZENITH LAPTOP COMPUTERS ***

SUPERSPORT 184-1	2 3 1/2" Floppy Drives, 640K RAM	\$1587.00
SUPERSPORT 184-2	1 Floppy, 20 Meg Hard Disk, 640K RAM	\$2373.00
SUPERSPORT 286-20	12/6 MHz, 80286 CPU, 3 1/2" Floppy, 20 MEG Hard Disk	\$3292.00

*** VIDEO MONITORS ***

ZCM-1490	ZENITH Color Flat Screen VGA	\$718.00
MA2565	SAMSUNG Amber TTL 720x350	\$89.00
CW4644	SAMSUNG Color RGB 640x200	\$274.00
CM4531	SAMSUNG Color EGA 640x350	\$389.00
CN4551	SAMSUNG Multi-sync VGA 800x560	\$489.00
NC800	NEC Multi-sync II 800x560	\$639.00

*** ZENITH PC COMPUTER UPGRADES ***

SmartWatch from FBE Research Installs in ROM Socket on CPU Board in Zenith computer series Z-100/138/148/150/160. This clock/calendar contains a ten year battery and keeps your computer informed of both time and date at each boot-up. Instructions and software included. \$38.00

Z-150 Series Hard Disk Drive Kit Includes new generation High Speed (28 MS) Seagate Drive with Auto Park heads. Each kit is complete with controller card, cables, hardware and instructions to mount the Hard Disk under your two floppy drives in the Z-150 series computers. 32 MEG ST-138/150 Kit \$383.00

Z-148 Hard Disk Drive Kit Includes the Hard Disk Drive and controller in the kit above plus the Z-148 Expansion card described below. Each kit includes all cables, hardware and instructions required to replace one floppy drive with a high speed low power Hard Disk Drive. 32 MEG ST-138/Z-148 Kit \$459.00

ST-138/Z-148 Kit With SmartWatch \$489.00

Z-148 Expansion Card adds 2 IBM expansion slots \$79.00
with SMARTWATCH clock/calendar. \$109.00

INTERNAL MODEM Fully Hayes compatible (software included)
1200/300 baud \$94.00
2400/1200/300 baud \$159.00

EXTERNAL MODEM Fully Hayes compatible (software included)
1200/300 baud \$137.00
2400/1200/300 baud \$199.00

VCE 150 Video Eliminator for Z-150
Allows use of EGA or any video card. Required memory chip included. \$54.00

V-20 Chips High Speed NEC V-20-8 8088 replacement. These run at up to 8 MEG and are said to increase CPU speed 10-30% \$14.75

*** Z-100 SERIES COMPUTER UPGRADES ***

High Density 1.2 Meg Drives. External floppy drive set-up complete with drive, power supply, case and cable. Ready to connect to your 8" floppy controller Single Drive Unit 234.00 Dual Drive Unit \$351.00
Bare Drive and Cable for internal mount \$136.00

SmartWatch by FBE Research. If you don't have a clock for your Z-100, get this one. More details under PC upgrade listings \$38.00

Gemini Emulator Board. Makes the Z-100 compatible with the IBM PC library of programs. \$432.00

UCI EASY PC. IBM PC Emulator. Makes your Z-100 IBM Software Compatible. Full 8 MEG operation, color graphics and audio compatible. \$477.00

UCI Easy87. Add an 8087 Numeric Coprocessor. \$69.00 for the board without an 8087 Chip. With 5 MEG 8087 \$188.00 or with 8 MEG 8087 installed \$234.00

ZMF100A by FBE Research. A modification package which allows 256K chips to be used on the old-style motherboard to reach 768K. Simple assembly with no soldering or trace cutting. Compatible with Easy PC and Gemini Emulator. . . \$60.00
Requires 27 256K RAM chips to complete the kit.

UCI Memory Upgrade Pal Chip Set For the Z-100's with the newer motherboard part number 181-4918 or greater. This chip set allows the installation of 256K RAM chips on the motherboard. With the addition of 27 256K RAM chips, a total memory of 768K is obtained. PAL Chip Set \$64.00

UCI Memory Upgrade Card We recommend this one highly. The board has sockets for up to 2 MEG of RAM. With no RAM installed \$288.00. Add \$35.00 for EasyDrive RAM Drive Software if desired. Either 64K or 256K RAM chips may be used to complete this kit.

UCI EASY-I/O S-100 board that provides IBM PC communications port compatibility with your EasyPC. Easy/I/O-1, One Serial Port \$91.00. Easy/I/O-2, Two Serial Ports, One Game Port, Clock- Calendar \$127.00

UCI EasyWin Winchester Drive Systems at reasonable prices. Complete Hard Disk Systems for mounting inside your Z-100. Systems complete with Seagate Drives, 21 MEG \$598.00, 31 MEG \$634. System without Drive \$317.00

CDR Z-100 Speed Module Run your Z-100 Computer at 7.5 MHz. Installs easily with no soldering. Externally switchable between Speed and Normal mode. Payload \$44.00

*** FLOPPY DISK DRIVES ***

MITSUBISHI MF501	5.25" 48 TPI DS/DD 320K/360K	\$89.00
MITSUBISHI MF504	5.25" High Density 360K/1.2 MEG	\$106.00
MITSUBISHI M-353	3.5" in 5.25" frame 720K	\$98.00
MITSUBISHI M-355	3.5" in 5.25" frame 1.44 MEG	\$129.00
	M-355 Software Driver	\$19.00

M-355 runs on AT compatible or special controller only.

** SEAGATE HARD DISK DRIVES **

ST-125	21 MEG, 28 MS, Auto Park Heads With Controller & Cables	\$275.00 \$329.00
ST-138	31 MEG, 28 MS, Auto Park Heads With Controller & Cables	\$329.00 \$383.00
ST-238	31 MEG, 65 MS, RLL With RLL Controller & Cables	\$258.00 \$309.00
ST-251	42 MEG, 40 MS, Auto Park, Software With Controller & Cables	\$384.00 \$438.00
ST-251-1	42 MEG, 28 MS, Auto Park, Software With Controller & Cables	\$465.00 \$519.00
ST-4096	82 MEG, 28 MS, Auto Park, Software.	\$647.00

V-20 Chips High Speed NEC V-20-8 8088 replacement. These run at up to 8 MEG and are said to increase CPU speed 10-30% \$14.75

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We can assemble 8088 XT, 80286 AT or 80386 IBM compatible computers to your specifications. We use high speed turbo motherboards with Phoenix BIOS. Other features include clock/calendar, Keytronics 101 key keyboard, Mitsubishi floppy drives, Seagate hard disks, front panel mounted turbo and reset buttons, memory and I/O ports, all to your specification. Please write or call for price information. We can send you a work-up sheet showing items available and prices.

Example #1
IBM XT Compatible 8088 10 Meg CPU, two 360K floppy drives, 640K RAM, one serial port, one game port, two parallel ports, 101 keyboard, clock/calendar, 10 Meg CPU and amber TTL monitor \$831.00

Example #2
Same as above with the two floppy drives plus a Seagate ST-238 30 Meg RLL hard disk drive \$1126.00

Example #3
IBM AT Compatible 80286 12 Meg CPU, 2 Meg RAM, clock/calendar, one each serial, game and parallel ports, one 360K floppy, one 1.2 Meg floppy, 101 keyboard, Seagate ST-251 40 Meg hard disk, EGA color monitor \$2234.00

MS-DOS 3.3 Operating System \$85.00

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Jim Buszkiewicz

Heathkit's latest addition to their product line is the HS-3860 laptop computer. This engineering marvel, is a kit version of the Zenith TurbosPort Laptop Computer. This system is a true 32-bit advanced technology computer with a 12 MHz CPU clock frequency and zero wait-states. It is fully compatible with readily available software for the IBM-PC and AT computer systems. The kit comes standard with 2 megabytes of RAM, and can be increased to a maximum of 3 Mb by installing a 1 Mb module. For increased arithmetic processing, you may install a numeric co-processor.

The memory expansion feature is combined with a hardware implementation of the Lotus-Intel-Microsoft Expanded Memory Specification (EMS). This method, which uses applications that are larger than the 640kb memory limit of MS-DOS, makes available up to 2 Mb of memory for software written to take advantage of the EMS.

The I/O (input-output) board contains a Centronics type parallel I/O port, and one 9-pin, RS-232C type serial port to use with a variety of printers or other peripherals.

ROM-based diagnostics are performed each time you apply power so you will always know the status of your computer. A more comprehensive disk-

based diagnostics package is also provided so you can easily confirm the viability of any part of your system throughout its life.

The HS-3860 comes standard with a 1.4 Mb, 3-1/2" floppy disk drive, and a 40 Mb Winchester (hard disk) drive. A detachable 101-compatible keyboard is also provided for greater flexibility.

An optional 2400 baud, Hayes-compatible modem is available which should be installed during the initial construction of the kit. If it is installed after the kit is built, a considerable amount of disassembly-assembly must be done.

The 640 by 400, fluorescent backlit, black/white LCD (liquid crystal display), produces one of the sharpest images I've ever seen on a laptop computer. The contrast ratio of it is 20 to 1!

The rear panel also includes a 15-pin video connector. Along with the supplied adapter cable, a standard RGB type color monitor can be connected to it.

The unit can be powered from the external power-supply/battery charger, or from the internal battery. The battery pack is a fast-charge, high-capacity type, which can power the computer up to 6 hours of continuous operation.

You're probably wondering how so much computing power can be stuffed into the same volume a briefcase occu-

pies. The answer of course is miniaturization, not mirrors! The main processor circuit board is a wonder to behold. Multi-layered foils no wider than a human hair, surface mounted proprietary integrated circuits that perform hundreds of different functions per chip and packaging/layout technology are the keys to this miniaturization process.

So, enough of the technical stuff! Let's build the "Dragon" (the name Zenith gave the TurbosPort-386).

If you've put off buying a Heath kit because you've been apprehensive about being qualified to construct one, let me simply say this, putting together Barbie's Dream House or G.I. Joe's Command Headquarters after Christmas, is ten times tougher! Heath's assembly manuals are second to none. In addition to pictorials, detailed instructions are provided to guide you through every step of the assembly, and if by some small chance you do get stuck, courteous technical consultation is as close as your telephone.

The HS-3860 computer is what I would call "The Un-Kit" kit. Although an electronic device, no soldering is required to complete the computer. Assembly consists of simply bolting together pre-assembled modules in the proper order. The sequence of assembly is shown in order, by the series of photos which follow.

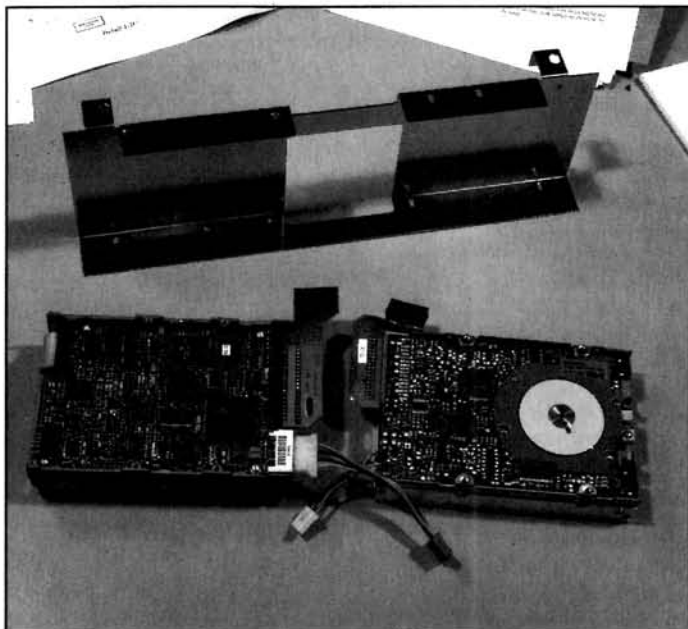


Photo 1
40 MB Winchester (left), 1.4 MB floppy,
and drive mounting bracket before assembly.

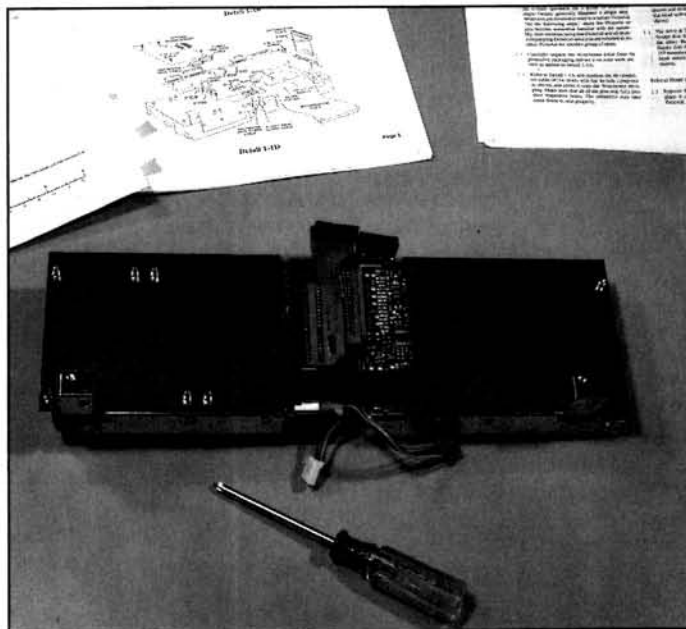


Photo 2
Drives mounted in place. Notice how the cables exit.

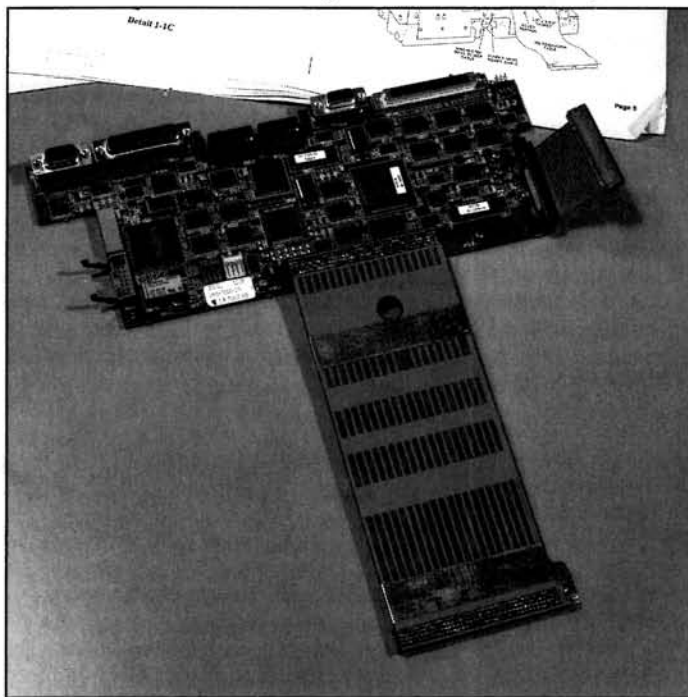


Photo 3
I/O module with cables installed. Note the large flat cable
in the foreground has 160 conductors!

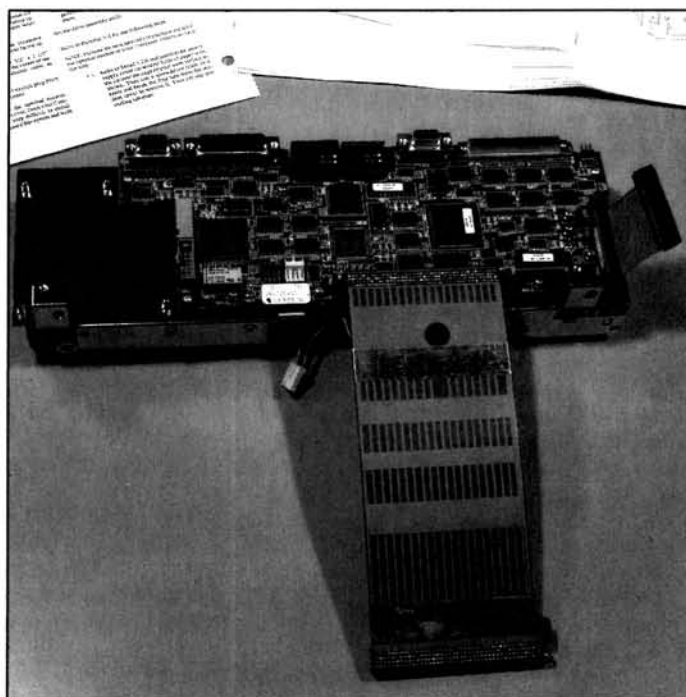


Photo 4
I/O module mounted in place.

Continued from Page 11
puter support line, if questions come up often, put 'em in print.

Let's have REMark talk to us and we will talk to REMark.

Thanks for your time and effort in reading this, and let's hope my comments and those comments of others help us all.

Sincerely,
Craig M. Owings
PSC Box 608
APO Miami 34002

Requests About REMark

Dear Jim:

Wanted to send along a note to tell you and your fine group how much I enjoy REMark. And while you are doing an overall very good job, at least I think so, there are a couple of things that I would like to see continued/added on.

1. The "Bullet" holes — PLEASE continue to use them. Quite a few of us at the

local HUG group file our magazines in loose leaf binders and these holes make it a lot easier. (Ed- OK!)

2. HUG Discount List — Please Find a way to include some type of short description on what each of these products are. You may know your product list by heart, but it takes me a lot of digging through back catalogs to find out if I'm going to buy a CB antenna, a ham dummy load, or get a very good buy

Continued on Page 15

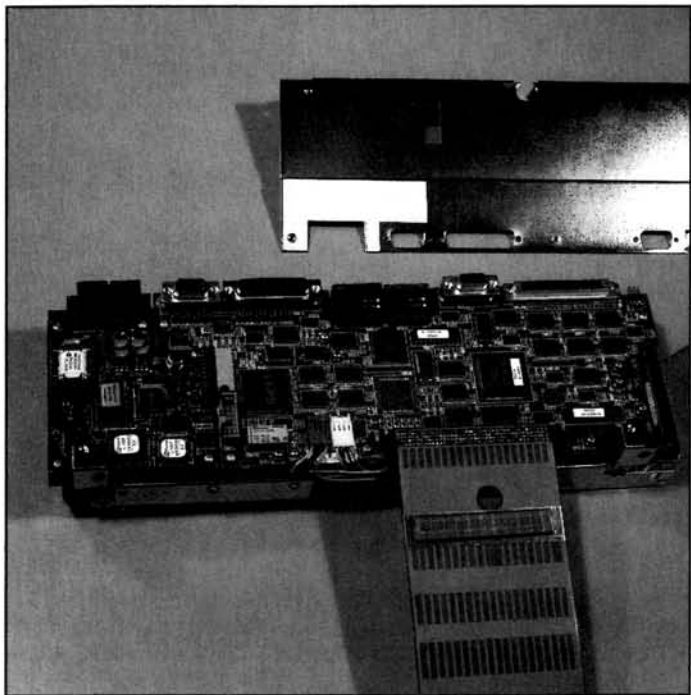


Photo 5

Modem board installed on the left side of the I/O module. Note the positioning of the modem insulting paper on the modem shield (background).

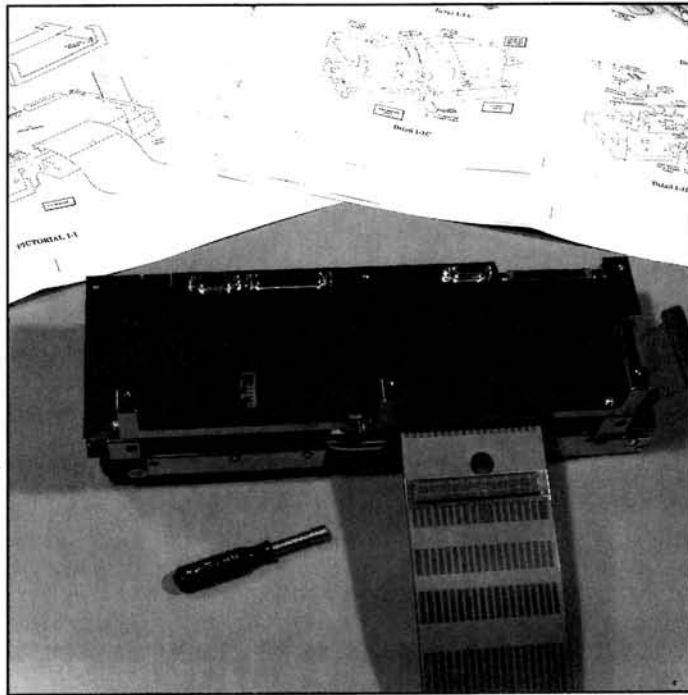


Photo 6

Shield mounted in place.

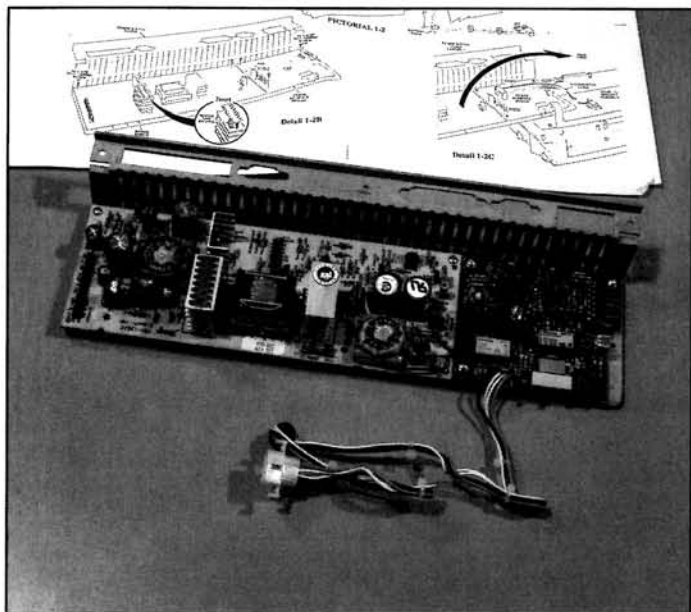


Photo 7

Power supply (left) and interface modules mounted to the power supply cover.

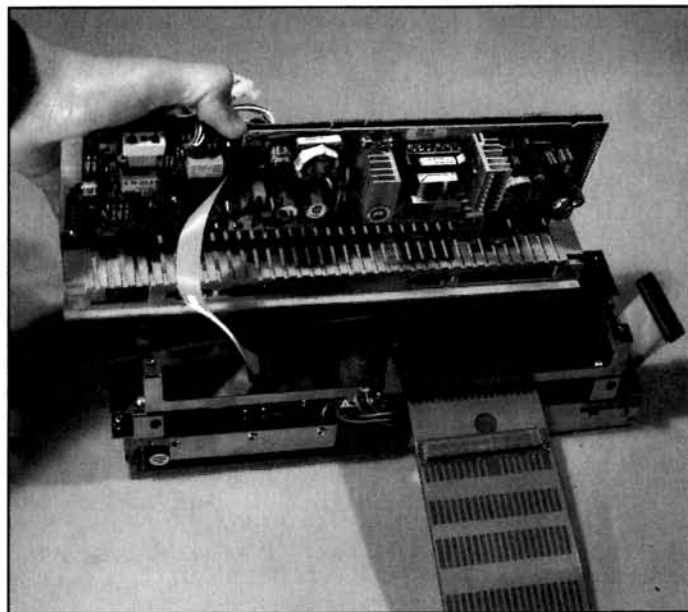


Photo 8

Positioning the power supply assembly onto the drive bracket.

Continued from Page 14

on a recently discontinued computer. Two or three words would tell us in which general field the products lies. (Ed- The discount list is being provided by Marketing Services. We simply print it verbatim.)

3. HUG Price List — Reinstated your way of telling us in which issue each piece of software was reviewed. Many times I have tried to look up something in

which I am interested (again), and it takes quite a bit of digging to find it. (Sounds like you need MAGBASE HUG P/N 885-3050.)

4. The Issue Number — Each issue of RE-Mark used to have a serially numbered issue number on it. I put these on the back spline of my loose leaf binders and it saves time in trying to find an article that is referenced in a recent article. (Ed- References to REMark are al-

ways by month and year. The issue number is not needed, and was sometimes printed in error, making the system useless.)

I guess quite a few items, but they would add a lot to my enjoyment of your magazine and save me time. After all, isn't that what we are trying to do — have as much fun as we can in the spare time we have???

Continued on Page 16

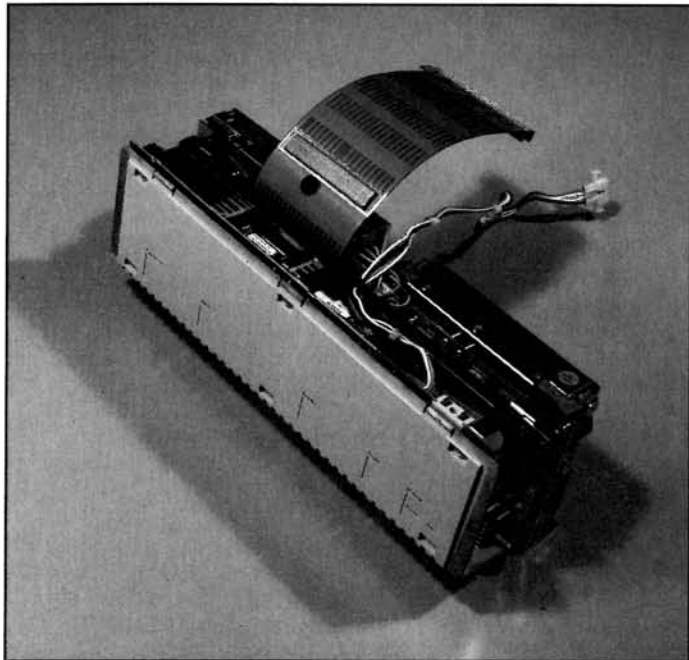


Photo 9
The completed "sandwich"!

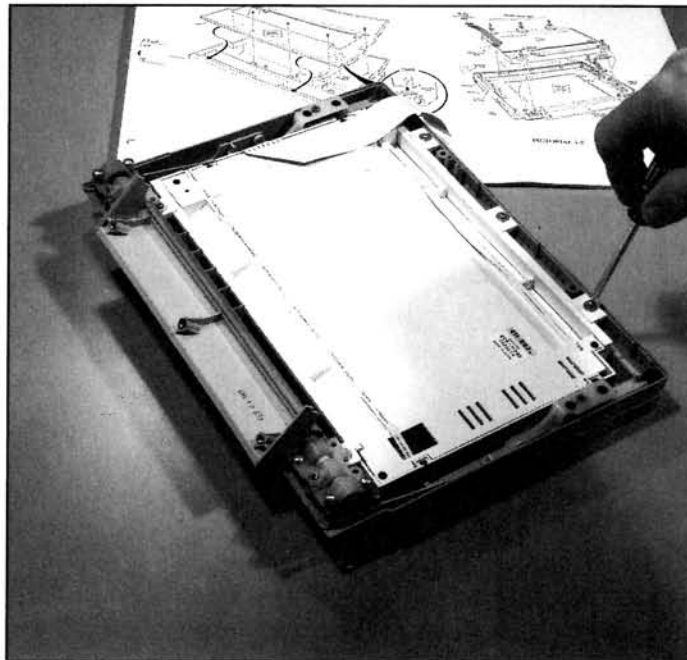


Photo 10
Mounting the liquid crystal display in place.

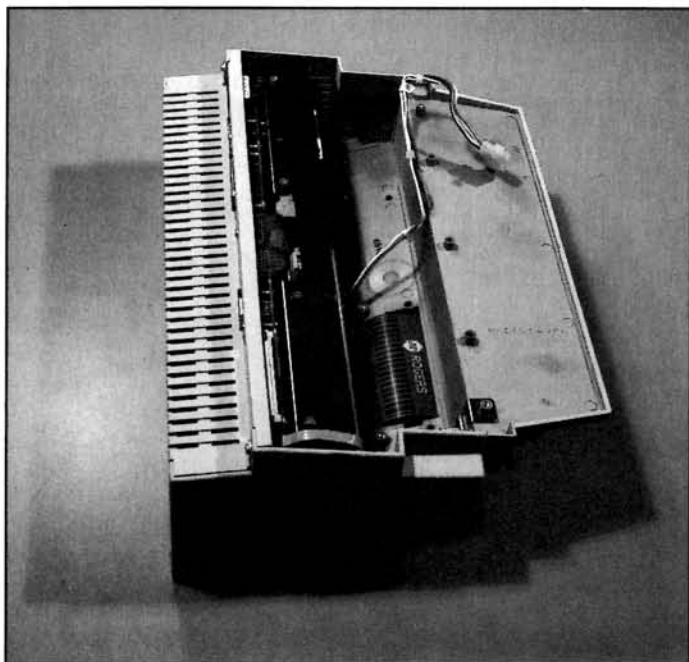


Photo 11
The power supply "sandwich" is mounted inside the main cabinet.

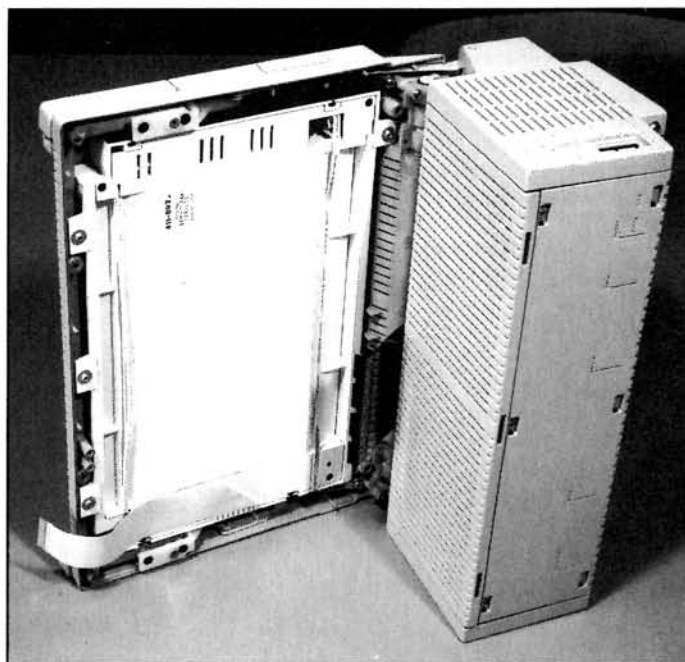


Photo 12
The main cabinet is mounted to the display cover (rear view).

Continued from Page 15

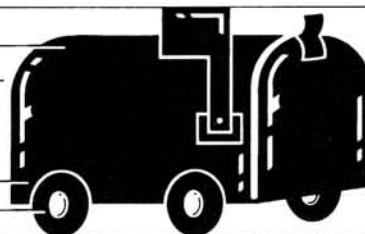
On reading over this list I would have to say I feel pretty strongly about the first three, while four would be nice to have item.

Again, I really look forward to each issue, and while my trusty old Z-100 is about gone, most of the articles still hold my interest.

Sincerely,
Frank Shacklett
772 Harvard Avenue
Sunnyvale, CA 94087

*

MOVING?



Don't Miss A Single Issue!
Let us know 3-4* weeks before you move!

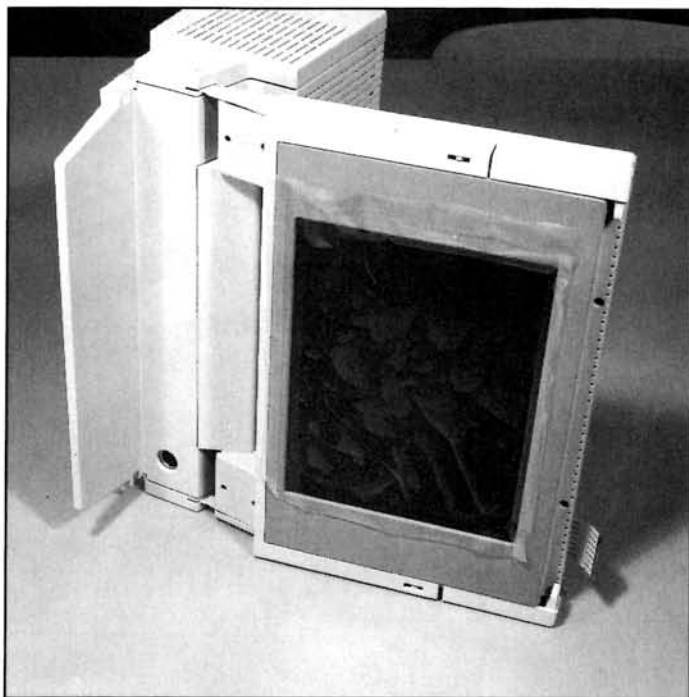


Photo 13
The main cabinet/display (front view).

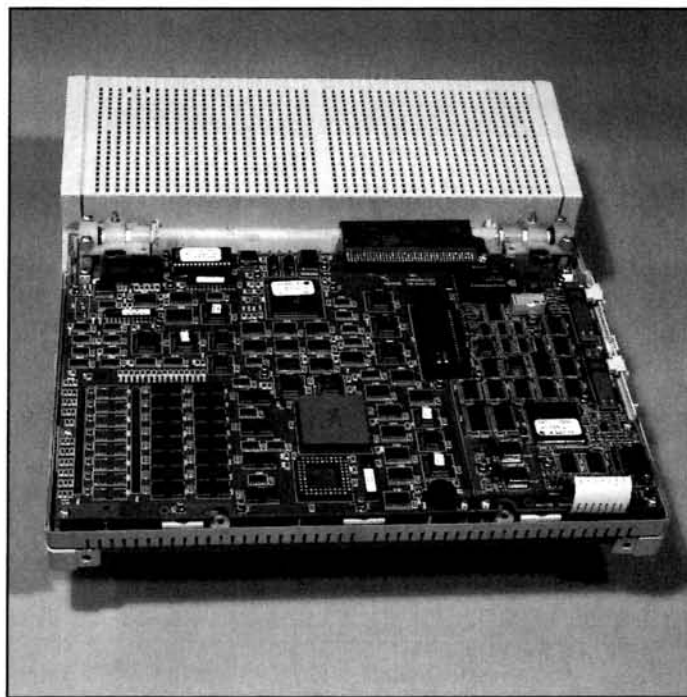


Photo 14
The main CPU board (left side) and video board are mounted to the back of the liquid crystal display.

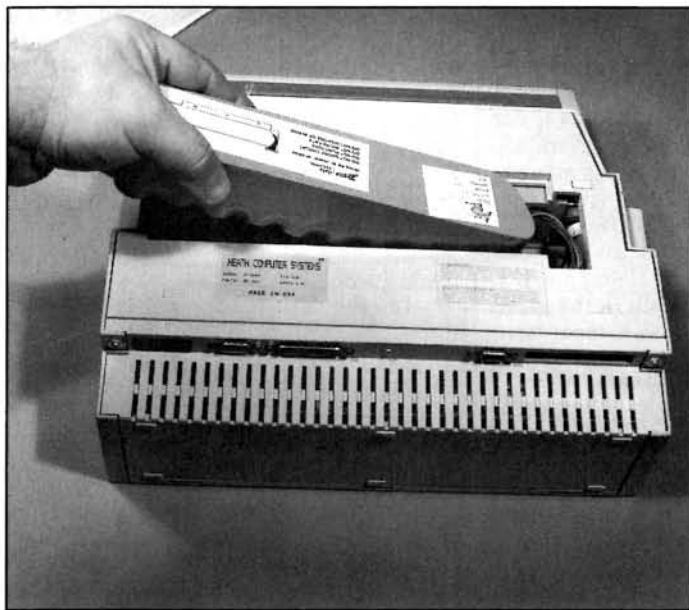


Photo 15
Installing the 'hefty' battery pack.

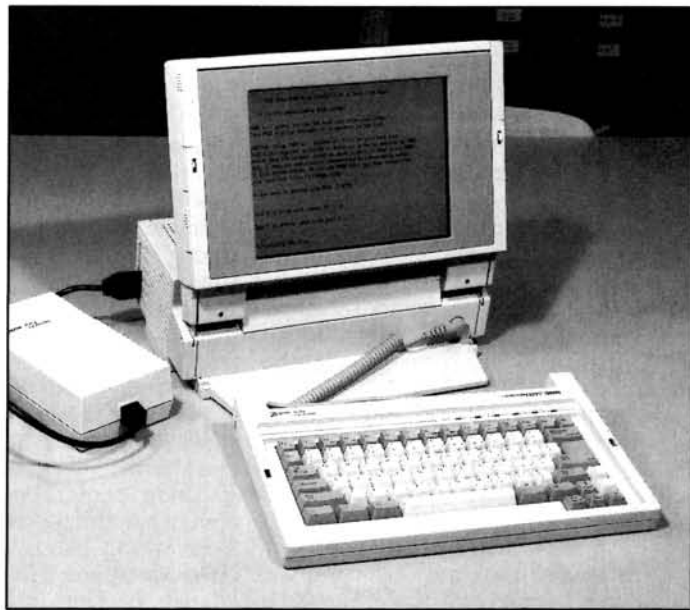


Photo 16
And it 'works' the first time!
The AC power supply/charger (left), comes pre-assembled. *



**EXPLORE
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SOFTWARE**

Graphics Printer or Epson FX Part 3

Controlling Your Printer (Continued)

John A. Day
5 rue Sauer
77500 Chelles, FRANCES

Down the Page . . .

In the two previous articles, we looked at what small matrix printers are, and how you can control horizontal formats in Epson FX ('F') and IBM GP ('G') modes. Now, we'll go into vertical positioning. The most basic instructions are ESC "j" n (both emulations) and ESC "J" n ('F' only). Both of them rotate the platen stepper motor n steps; "j" moves it forward, and "J" reverses it. Remember that the motor is always geared to 1/3 of the pitch between two adjacent pins; so ESC "j" 3 moves you down the distance between two pins, ESC "J" 24 moves pin 1 down to the previous position of pin 9, and if your print head is on 1/72" centers, ESC "j" 36 moves you a standard 1/6" line feed. Incidentally, on the original FX printers, Epson provided reverse feeding on the narrow platen model only and warned against using this command with continuous forms. I have used it as standard for continuous forms and cut sheets, on all sizes of platen without problems.

The first use of these codes is to replace the tear-off option on the expensive printer you couldn't afford. Your printer has a tear bar against the platen, but it's about 3/4" from the top of the first print line. Would you like to print closer to the top of the paper? It's easy. Set the paper perforation against the tear bar for easy document separation. Start your document with:

```
ES = CHR$(27): Z$ = CHR$(0): O$ = CHR$(1)
LPRINT ES"j"CHR$(114): ES"J"CHR$(6);
you will have to repeat the LPRINT after
each form feed. This code moves the pa-
per down three lines before printing,
```

which is about as close as you can get the top edge to the print head without the paper coming out of the bail bar. If your printer won't accept three lines, reduce it to two by putting 78 instead of 114; flat guides hold the paper better than rollers. Notice that the control sequence actually reverse feeds a bit over three lines, then moves forward a fraction to come to exactly 108/216". This catches any backlash in the platen drive; you get better line positioning by always moving it in the same direction before printing. You might have to open the cover, as the edge of the sheet may catch against the tear bar.

The same principle can be used to give the paper a shake. I have had a lot of problems with WordStar 3.4 on a back-spacing printer, because bold characters were overprinted one at a time. If the paper wasn't exactly in proper alignment, the vibrations from the oscillating print head, backing up 3/4" twice for each character, let the paper slowly settle to the right spot, giving a gentle diagonal form to the word. I finally hit on the trick of starting such lines with subscript on/subscript off — WS 3.4 used a platen roll for sub/superscripts, and not the special half-height characters. The sequence fine-feeds the paper, then brings it back, and takes up any slack nicely.

ESC "j" 18 gives you a half-linefeed in reverse, the ESC "J" 18 does the same in a forward direction. With these, you can easily put fractions in a text. But be careful doing any reverse feeding while the bottom of the sheet is going around the platen; even the perforations can foul projections underneath.

Since ESC "j" n doesn't exist in 'G' mode, you shouldn't have problems with small differences: ESC "J" is one of the jokers. The 'F' instruction rocks the platen without moving the head. The 'G' instruction forces a carriage return. This means that certain graphics screen print programs designed for the GP won't run with anything else, because they count on the automatic CR to move the head back for the following line.

LF, the line feed code, the paper moves forward one line, but how much is a line? Looking in your printer handbook, you will find about three pages of command sequences concerning line spacing. Don't worry, the only command you need is ESC "A" n ('F' emulation), or ESC "A" n ESC "2" ('G' emulation). n is the new line spacing in 1/72"; 12 for 1/6" spacing, the power-on default. This is another of the jokers that prevents you from using one man's software with another man's printer. The 'F' sequence ESC "2" sets line spacing to 1/6". The 'G' sequence ESC "A" n doesn't set anything until the ESC "2" is given. So an IBM sequence sent to an FX printer will select a new linefeed, then restore it to 1/6"; whereas an Epson sequence sent to a GP printer won't budge it from the power-on 1/6".

FF, form feed, moves you to the top of the next form, as long as the page length is set correctly. For cut sheets, the setting doesn't matter very much, because the printer will spit the sheet out and maybe go on winding the platen a bit after. With continuous forms, you must set the page length equal to the distance between paper perforations. This is usual-

ly set automatically at power-up to 11" in the States; Europe uses 11" or 12", the longer sheets being better for Din A4 copies. If you switch to a different length, you can set it (up to 22") with either ESC "C" n, where n is the length in lines, maximum 127; or ESC "C" O n, where n is the length in inches. Both are converted to internal absolute values, so you can change line pitch after setting the page length without altering your setting. With continuous forms, you should get into the habit of setting the top edge to the tear bar at power-up, or when loading and after a manual form feed, and then not touch the platen knob. To advance the paper, take the printer off-line and use the panel buttons, or use LF and FF codes sent by the micro. This is the only way to keep proper form alignment.

I've never used vertical tabs on matrix printers, but I have used them to good effect when invoicing on a mainframe computer. For this, you would usually set a first tab to the addressee's name, a second to the head of the invoice proper, and a third to the line for the total at the bottom of the page. Instead of counting lines in the address and in the invoice detail lines, you just print, then tab to slow the paper down to the proper line. In 'F' codes only, set up to 16 tabs with ESC "B" n1 n2 ... 0. n1, n2, ... are line numbers, in ascending order, up to a maximum at line 255 (but you won't be using forms that long). As with horizontal tabs, these values are stored in absolute form, so even if you change line spacings, the tabs stay in the same places. VT [CHR\$(11)] slews the paper down to the next tab line.

Don't bother with ESC "b" ... and ESC "/" ... if your printer has them. These codes let you set up eight different vertical tab patterns and switch between them, whereas I bet you won't even use one.

Your printer has a sensor to detect out-of-paper, but it may be up to two inches away from the print head — which is a lot of paper for a cut form. Look to see whether your printer handles this automatically. Some printers disable the sensor completely in sheet mode, while others count lines from detection of the bottom of the form, and only go off-line when they reckon the end of the paper must be near the print head. If yours does neither, you can disable the sensor before end-of-paper with ESC "8", then enable it again with ESC "9" after the form feed, FF. Be careful with this one, because if you don't do it right, you will find yourself printing on the platen, which a) is not very readable, b) makes the platen greasy, and c) shortens the print head life. Once the sensor detects out-of-paper, the printer goes off-line and won't accept any more commands until paper is inserted, so you must disable the sensor before the end of the sheet reaches it, and only enable it

when the next sheet is supposed to be in place.

A nice code to close with is ESC "N" n. This lets you skip n lines at each end-of-page, which stops the printer from printing on the perforations. I set this whenever I'm printing programs without page formatting; 8 lines is about right if the perforation is set to the tear bar:

```
LPRINT ES"!0$;ES"1"CHR$(12);ES"Q"CHR$(
96);ES"N"CHR$(8);
sets 12 cpi, left and right margins, and a
perforation skip-over. I don't keep the
skip-over with word processors, however,
because they keep track of where the per-
foration is by software. If the printer and
the program are looking after this, the re-
sult is usually confused. ESC "O" clears
perforation skip.
```

It's worth while setting up a menu-driven BASIC program to switch printer defaults between two jobs. The detailed code depends on just what printer you have and just what you want to do, so I'm not giving any sample code. You should arrange to select at least 10, 12, or 17 cpi, set left and right margins, and set a perforation skip-over. I also included line spacing in lpi, millimeters or lines per page; the only one that anybody uses is 3 lpi for draft documents to be annotated (in which case, use 4 lines for the skip-over and not eight). My program also covers NLQ (later in this series) and downloading (in the last articles). For often-used sequences, like printing assembler or compiler lists, I prefer to have binary files on disk which I can copy to the printer as part of a batch procedure; I'll go into that after special effects.

Special Effects

We'll start with the easiest: double-strike. ESC "G" sets double-strike mode, and ESC "H" clears it. After printing the line normally, the printer moves the platen down one motor step, and prints anything to double-strike a second time: see Figure 3-1. This gives a heavier than normal character. Horizontal lines are still made up of discrete dots, but the vertical offset of 1/216" between adjacent passes blurs verticals into a uniform line. This is where we meet unidirectional printing. You will have noticed that your printer prints alternate lines backwards. Everything is fed forward from the computer, but alternate lines are stocked forward into the printer's internal buffer, then read out backward as the head comes back from right to left. This nearly doubles the printer's speed, since the head is never idle (nearly, because the head slews back empty a bit faster than when printing). But ... there's always some backlash in the head drive, even when the printer is new; and only big, expensive office printers have compensating circuits to eliminate this. If you print from left to right, then overprint from right to left, the two halves

can be out of register by over 1/50". If the head is moving the same way both times, you can't see any mismatch even with a pocket magnifier. So when you double-strike, the printer will return to the margin without printing, then overprint the line. This means that double-strike is about three times slower than normal printing.

In the 'F' code set, double-strike is also controlled by ESC "I" n, which we saw in the second article. Use n = 16 to set double-strike, in conjunction with any other values you want. n = 8 sets an apparently similar effect, emphasized print, which you can get in either 'F' or 'G' modes with ESC "E" to set, and ESC "F" to clear. Emphasized and double-strike are quite different in their mechanisms, though. We've already seen that printing each dot twice, while keeping the head moving at the standard speed, spreads the character out to twice its normal width. If you do the same thing, but slow the print head to half speed, you get the standard character width, but every dot is shadowed slightly to the right. At half-speed, the pins can be fired every 1/120", instead of every 1/60", while keeping within the same limit of 1000 strikes/sec. This means that horizontal lines print as continuous, because at 1/120" spacing the dots blur into a line. So: double-strike prints twice at full speed, and gives continuous vertical lines, whereas emphasized prints once at half speed and gives horizontal lines. If you use both effects together, you will get high-resolution draft characters with good blacks, and the dots will be nearly invisible.

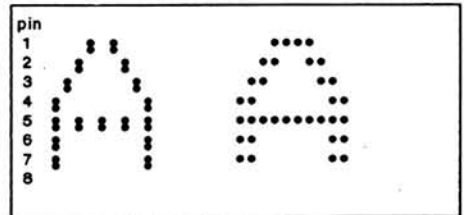


Figure 3-1
Double-strike and Emphasized Print

The other effects are quite straightforward. For 'F' codes only, use ESC "4" to select italics and ESC "5" to clear. This adds 128 to the code for every printing character, to use the italics forms in positions 128 to 254 of the character generator. Italics can even be used to check which emulation you're using: if you can't get them on your printer, it probably means that it's been switched to GP emulation. For 'F' and 'G', ESC "-" 1 sets underline, and ESC "-" 0 clears it. Underlining is usually done as a separate operation, in which the paper is moved up 1/72" and a line drawn with pin 9. Expect trouble if you mix this with 'G' semi-graphics characters. Also, an 'F' emulation should double-strike an underscore, and keep underlining through tabs, whereas the 'G' emulation will not do this. Some manu-

facturers have added these to the 'E' ESC "I" n codes, with n = 128 for underscore and 64 for italics, although this was not on the original FX printer.

In both emulations, you can squash all characters to half-height with ESC "S" 0 or ESC "S" 1 (cancelled by ESC "T"). This is done in two passes of the print head, using the upper five pins for ESC "S" 0 and the lower five for ESC "S" 1. "Odd" dots are printed on the first pass, then the paper is advanced one step (1/216"), and the "even" dots are printed. This can't be mixed with double-strike, because you can only have two passes in all. Mixed with ordinary printing, this gives superscripts and subscripts. But you can use this effect on its own to give fine print, combined with a line spacing of 10 or 12 lpi (ESC "A" 7 / ESC "A" 7 ESC "2"; ESC "A" 6 / ESC "A" 6 ESC "2"). 12 cpi is a rather wide character, while 17 cpi needs good eyesight.

For WordStar 3.3 and 3.4, I set up the four user functions to get two effects:

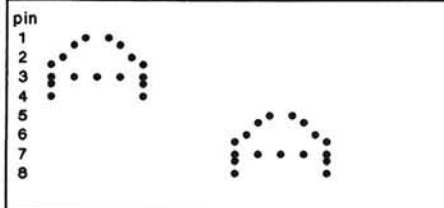


Figure 3-2
Superscripts and Subscripts

^Q: ESC "S" 1, underline on
^W: ESC "S" 0, underline off
^E: ESC "4", italics on
^R: ESC "5", italics off

The built-in underline gives a better quality than the 3.3 or 3.4 overprinting with the _ character, since it is 1/72 lower. You must be careful to switch the ^Q underline off at the end of each line. For the moment, I've only tried 4.0 with a DP printer using 'D' codes, and the built-in commands are sufficient for me not to have got around to user functions yet.

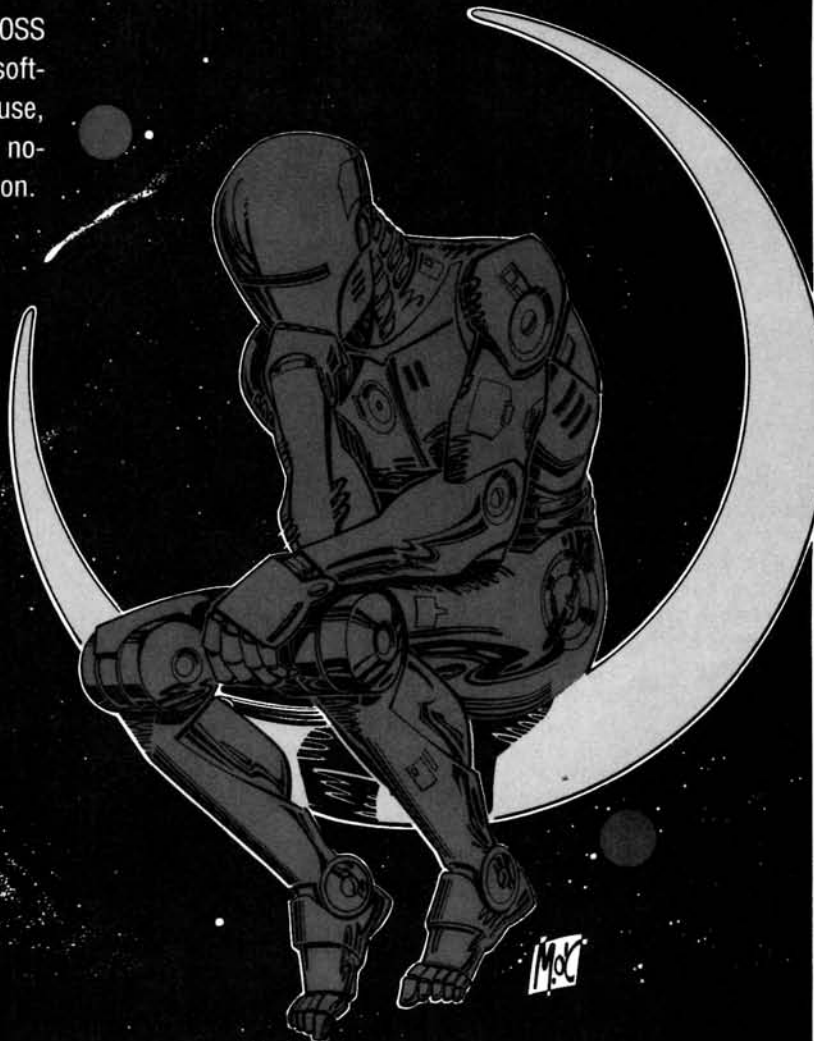
The last few codes you may need cover odd bits and pieces:

- If you need perfect vertical alignment, ESC "U" 1 restricts printing to one direction only, eliminating errors due to backlash in the head drive mechanism. If you want printing left-to-right, add an ESC "<" just before; this moves the head to the left margin. When I timed one-way printing, it took 50% more time than bidirectional — which is restored by ESC "U" 0.

- ESC "s" ('F' codes only) will set the printer to half-speed. With very dense printing, there's less risk of overheating the control circuitry at this speed.

In the next article, we'll wind up draft printing by looking at how to select character sets — which will mostly interest Europeans, but the Spanish characters can come in useful in the southern States — then go on to the NLQ and proportional spacing. *

Don't get HYPER or CROSS because your modem software is too complex to use, get HUGMCP for the no-hassle modem connection.



POWERING UP



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Maintaining Your Computer System

Computers, like most other hardware, require occasional maintenance, and it is unfortunate that this topic is frequently overlooked in many articles and books. This article includes some suggestions on easy-to-do, periodic service that can help maintain your computer system and reduce the number of potential problems that might otherwise occur. You will also see how some common problems make themselves known and what you can do to fix them. One of the more important routine tasks that can help prevent problems before they start is simple cleaning.

Keeping the CRT Clean

Keeping your computer and its peripherals clean is one of the most important maintenance tasks that you can do. But there are several things that you need to know about the types of cleaning that need to be done. Perhaps the need to keep the CRT display clean is the most obvious of all.

There is nothing quite so disconcerting as a CRT display that has fingerprints or smears on it. It is difficult to read, and it is very distracting when you are trying to write something. There are, however, some things that are especially important when you clean a CRT.

First, before you use any cleaning solution on your CRT, be sure to read the owner's manual. Some CRTs have a special, non-glare coating that reduces reflections from room light, and some cleaning solutions should not be used on some CRTs because they will "remove" this non-glare coating. For example, you

may find the owner's manual tells you NOT to use a cleaning solution that contains ammonia. After repeated usage, ammonia may dull or remove that non-glare coating. If your manual specifically mentions ammonia, then you should not use a common window cleaning solution, like Windex with ammonia, to clean your CRT. There are two ways to solve this problem.

My preference is to buy a window cleaning solution by the gallon that is intended to be used in my car's windshield-washing system. You can generally find this at any auto parts store, but you want to check to make sure it does not have ammonia or any other chemical that is specifically mentioned in your CRT's owner's manual. I also use this solution on the inside windows of my car because it has tinted windows, and I was told not to use an ammonia-based cleaner on them. For real heavy-duty window cleaning around the house, it is easy to add a small amount of ammonia to clean windows, mirrors, etc. And there always seems to be more than enough spray bottles to use for dispensing the solution. I have found this approach works well, and it is very inexpensive compared to buying a commercial window cleaner in a spray bottle.

When you clean the display surface of a CRT, you also want to use a rag or towel that is relatively lint-free so you won't leave annoying pieces of the material on a clean CRT. My usual preference is to use an old, WELL-washed towel for most cleaning because it is quite absorbent, but I have found some "lintless dust

rag" that also work quite well.

To keep your CRT display easy to read and looking its best, you will probably find that you need to clean it at least once a week, or whenever you use it, whichever is least frequent. The display surface of a CRT tends to accumulate static electricity, and that attracts dust. So even if you don't use your system that much, you will probably find that it still becomes "dirty" between computer sessions.

If you don't want to fool around digging up old rags and finding an appropriate cleaning solution, you can also buy something called a "video display cleaning kit". These kits typically contain a small amount of special cleaning solution (without ammonia) and a supply of lintless towels. Prices for these kits range from about \$4-10, depending on where they are sold. In general, they are extremely expensive considering what you get, but they have the advantage of having everything you need in one place.

Cleaning Exterior Computer Surfaces

Most computer experts agree that you should not eat or drink around your computer system. Cookies, cake, coffee, and Cokes can be deadly to your computer, keyboard, and floppy disks. A few cookie crumbs mixed with something sticky, like a Coke, can do wonders for your keyboard, not to mention what can happen to a floppy disk or disk drive. Although it is easy to say that one should not eat or drink around a computer, my observation is that very few hard-core computer users follow that advice. Even

though I rarely eat anything around my computer, you can usually find me with a cup of coffee or a glass of iced tea while I am working. And while I recognize the common sense of not eating or drinking around my computer, I do it anyway, and I need to remove the occasional drips of coffee and iced tea from the computer and keyboard.

Perhaps the most important point here is to at least recognize the hazard involved, particularly with any kind of drinks around a keyboard. At some point, you will be so involved with what you are doing that you will invariably spill an entire cup of coffee (or whatever) on the keyboard. I have. But I made the decision to accept the risk of having a cup of coffee while I am working and to accept the consequences of spilling it if it happened. It took me several hours to disassemble the keyboard and clean it after one fiasco, but that was a risk I had previously decided to take. Although I was able to clean the keyboard so that it worked correctly, don't mistake this as a "testimonial" because I still don't recommend eating and drinking around a computer. In an extreme case, you can totally ruin a keyboard by spilling something on it, and you will have to buy a new one for \$100 or so. I was lucky in this particular case, but I had also accepted the idea that I might have to buy a new keyboard.

Aside from accidents, it is easy to keep the exterior of your computer system and its peripherals clean. To make it easy, I generally use the same cleaning solution for the exterior of my computer and keyboard that I use for cleaning the CRT.

When you are cleaning your system or a peripheral, NEVER spray the cleaning solution directly on it -- the cleaning solution may end up in a place where it should not. Spray the solution on your cleaning towel or rag, and then use the dampened towel to clean your system. Again, be sure to check your owner's manuals for specific cautions about the cleaning chemicals on each unit you have.

Cleaning Floppy Disk Drives

Periodic maintenance of floppy disk drives is also important, and it can help ensure the integrity of programs and data stored on floppy disks. Some experts recommend that floppy disk drives do NOT need to be "cleaned", but I disagree. The reason is that a floppy disk drive contains at least one Read/Write head, and each head actually makes physical contact with a floppy disk during read and write operations. This is much like the way a phonograph needle makes physical contact with a record. Because of this physical contact, it is inevitable that some of the oxide surface on a floppy disk will be deposited on the Read/Write

head. That explains why a floppy disk can actually "wear out", and it is also why I always recommend keeping backup copies of all files on another disk. In any case, these deposits can build up on a Read/Write head to the point that a floppy disk drive may become unreliable for reading and writing data.

Oxide deposits on the Read/Write heads can be reduced or eliminated by periodic cleaning with a "floppy disk drive cleaning kit." This kit typically includes a special cleaning solution and is applied to a "disk" made out of a foam-like material. You normally spread a few drops of the cleaning solution to part the special disk to loosen these deposits, and the remainder of the disk is used to dry the head. Most of the kits I have seen suggest that the drive be activated for about 30 seconds, and I generally use the FORMAT command for that, although you can use any other command (e.g. COPY) that activates the drive. These kits are available in various sizes (i.e. 3.50", 5.25", and 8"), and most can be used for about 15-30 times depending on the size of the disk and brand of the kit. The cost for these kits ranges from \$5-10 depending on the size of the disk.

How often your floppy drives need to be cleaned depends, of course, on how much you use them. I generally use one of these kits to clean my floppy drives about every 3-4 months. Even though I use my system a lot, more frequent cleaning is unnecessary because I normally use my hard disk, except for backups. For occasional or weekend use of a computer system, a cleaning cycle of every six months or so is probably more than adequate, so one of these cleaning kits will probably last the life of your system unless you really use your floppy drives a lot.

Cleaning the Inside

Most computers have a fan that circulates air inside the computer system, and no matter how clean your house is, I have found that the areas around the fan tends to accumulate a lot of dust and dirt after about a year or so. It is important to remove this dust and dirt occasionally because it can reduce or block the air flow to your computer. When that happens, heat can build up inside the computer and significantly shorten the its useful life. Some computers even have a foam-like filter for the fan and it is especially important to clean them often. You can either buy a replacement filter or clean the filter in a mild soap solution if you have one. I have never seen a filter like this in a Zenith computer, but I have seen them in other brands.

To clean the inside of your computer, you must take the cover off. Don't be afraid to do this, and instructions for disassembly are included in your owner's

manual. If you have never removed the cover from your computer, it is a useful "educational" experience to see what is actually inside. When you do this for the first time, it is important to follow the disassembly instructions exactly, take your time, and never try to force anything. Just take it easy until you see how everything comes apart.

After you remove the cover, you will generally find that most of the dirt is around the power supply where the fan is. For most Zenith computers, the power supply is located in the back, right-hand side of the system unit as you would view it during normal operation. It is normally an enclosed, box-like unit that the power cord plugs into. And it is pretty easy to spot because that is where most of the dust collects.

I use a vacuum cleaner with a very soft bristle brush to gently clean off the collected dirt and dust from the power supply area. It is very important to use an extremely gentle hand to do this so you won't bump any of the system components or electrical connections. It is not necessary to remove every bit of dust from the area unless you want to spend an inordinate amount of time and care. You may also notice other areas inside the computer that have dust deposits, and if you can reach them with the vacuum cleaner brush, it is okay to remove the worst of the dust. If you have any doubts about it, or if it is difficult or impossible to reach with the vacuum cleaner, you are better off leaving it alone. In this situation, the best rule is: When in doubt, don't!

While you have the cabinet removed from the computer, don't forget to run the brush around the area where the fan intake or exhaust is. Most Zenith computers have a grill cutout around the fan area in the metal cabinet as well as other intake or exhaust vents in the cabinet. I generally use a cleaning solution to thoroughly clean these inside cabinet areas because there is no danger of disturbing the electronic components in the main chassis. While I have the cabinet removed, I also do a very thorough cleaning of its exterior too. Then, while I am waiting for the last traces of the cleaning solution to dry on the cabinet (just in case I missed any), I begin on the keyboard.

Most of the time, the soft bristle brush on the vacuum cleaner is adequate for removing dust from the keyboard (even inside the keyboard), but I use my system so much that I have found it useful to disassemble the keyboard about once a year for a very thorough cleaning. Unless I have spilled some liquid, a vacuum cleaner brush is usually adequate to remove the dust inside the keyboard housing. And since I already have disassembled the keyboard from its cover, it is also easy to thoroughly clean the

cover -- to remove any coffee spills or whatever -- using a towel dampened with the cleaning solution. Again, if you have any doubts about doing this, don't.

Now that the computer and keyboard has been cleaned, inside and out, there is one other routine maintenance job that I have saved until last.

Cleaning a Printer

Cleaning the external part of your printer is no problem because you can still use a towel moistened with the cleaning solution that was mentioned earlier. In order to produce clean documents however, there are two other components that need some special attention: the print head (or the daisy wheel) and the platen (the moving "rubber" roller in back of the paper). You can buy an appropriate "printer cleaning kit" for either a dot matrix or daisy wheel printer.

The print head or daisy wheel needs to be cleaned occasionally because ink can build up and cause characters to be "fuzzy", unclear or smudged on a document. For a dot matrix printer, most cleaning kits have a special type of "paper" that is used to remove excess ink deposits from the print head. To clean the print head, I insert this sheet of paper, and start the printer in the "test" mode. Of course the ribbon must be removed in order for this to work.

Some of the cleaning kits made especially for daisy wheel printers contain a small cup so that you can "soak" the daisy wheel in the included cleaning solution. That won't work for me because my daisy wheel printer uses a "cartridge" that contains the daisy wheel, so I just use the same cleaning "paper" that I use for the dot matrix printer. It works just fine for the daisy wheel too.

Have you ever had a paper jam or tear that resulted in printing part of the document on the printer's platen? Or, if you use a sheet feeder, have you noticed that paper occasionally does not feed correctly? Ink deposits and printer use can cause the surface of the platen to become smooth enough so that paper will not feed correctly, and the problem becomes worse.

Most printer cleaning kits include a special platen cleaning solution and a curved brush-like applicator that can remove the ink deposits and help "rough-up" the platen's surface to improve its paper-grabbing ability. Extreme care must be used with some of these platen cleaning solutions because they may dissolve plastic parts to some extent. To clean the platen, I power-on the printer, moisten the applicator with the cleaning solution, and press and hold the Line Feed (LF) button to rotate the platen for cleaning.

I have sheet feeders for both of my printers, and sometimes the paper feed

rollers become too smooth to feed paper properly. To fix that, I use a very fine grit sandpaper (e.g. 120 or 150) or one of my wife's old emery boards to rough-up the surface a little. If you try this, be sure to use a very light hand because you only want to remove some of the "smoothness" from the surface of the rubber, not actually sand it.

Some printer cleaning kits also contain a special cleaning solution and paper towels that can be used to clean the printer's plastic parts. I have also found my CRT cleaning solution works well for that.

After the print head and platen are cleaned, it is also a good idea to use a soft bristle brush on a vacuum to clean out the small bits of paper that always seem to accumulate around the platen and print head. Most of this will probably be "paper dust", but you will occasionally see some "dots" of paper that did not get completely removed when the tractor feed holes were punched.

Given the amount of usage that my printers get, I usually clean them about every month or so. To keep things easy, I usually try to clean it when I replace the ribbon because that is the best way to help perform this kind of maintenance periodically.

Most of what I have mentioned at this point is obvious routine maintenance that can help prolong the life of your computer and its peripherals. Removing dust and dirt from the computer's fan, and removing bits of paper from the printer are particularly important for this. Now that we have looked at some of the general computer maintenance, let's take a look at some other things that you may need to do.

Disk Drives

The disk drives (either floppy or hard disk) in your computer are basically mechanical units, and for that reason, they will likely have more problems than the electronic parts in your system. After lots of usage (i.e. wear), floppy disk drives can lose their alignment or the rotation speed may change. The alignment for a floppy disk drive is much like that on a car, and it must be correctly aligned so that the system can find each track on a disk.

The major symptom for a mechanical problem with a floppy drive is when you begin to see a lot of "Abort, retry, ignore" error messages, particularly with a disk that was formatted a long time ago when the drive was newer. The Read/Write heads may no longer be correctly aligned with the tracks, and it may be difficult or impossible to read from or write to an older disk. Although this kind of problem may also be caused by a well-used (i.e. worn out) floppy disk, it is more often caused by poor drive alignment. There is one way to tell. If the problem occurs

with a NUMBER of your older floppy disks, then you probably need some maintenance on the drive. If the problem occurs only with a specific floppy disk, then that floppy disk is probably near the end of its useful life.

Rotation speed is another thing that can change during the life of a floppy disk drive. For example, a 5.25" 360KB drive uses a speed of 300 RPM, and an 8" drive uses 360 RPM. There is not much tolerance in these specifications. Even a small change in the rotation speed due to wear can dramatically affect the system's reliability in reading from or writing to a disk.

When you begin to see a lot of the "Abort, retry, ignore" error messages for a number of different disks in a specific drive, it is time to think about having it serviced. This kind of service is generally beyond most users because it requires special equipment and knowledge to align a drive. You can generally get a floppy drive serviced and aligned for under \$30. Check with your local computer store to find out about this.

Hard disks also contain a lot of mechanical parts that wear out too. Most hard disks will have a mechanical failure long before the electronics "wear out." In many cases, you will have a mechanical failure with NO WARNING (e.g. a drive motor or bearing failure), and that is the main reason that I suggest frequent hard disk backups.

Many computer stores are now providing a "reconditioning" service for failed hard disks. Servicing a hard disk requires very special facilities (i.e. a "clean" room) and equipment, and few computer stores have this kind of on-site service capability. In most cases, you will find that they send hard disks out for repair, and it may take 1-2 months to get your drive back. Plan on a reconditioning cost in the \$100-200 range. Depending on the type and capacity of your hard disk, it may be more cost effective to buy a new one, so you will probably want to check that alternative before you decide.

The Keyboard

After you have used your keyboard for a while, you may notice that one key is not working exactly right. It may stick in the down position and generate unwanted multiple characters or it may not generate a character at all when pressed. Since each key is usually nothing more than a mechanical switch, you can sometimes fix this kind of problem without too much difficulty.

In most cases, a key problem is due to dirt that inhibits the mechanical action of the switch. Assuming that the switch itself is not "bad", you can generally fix this kind of problem and save yourself some money on the repair. First, you need to get a spray can of cleaner that is used to clean mechanical tuners on television

sets. You can generally find "tuner cleaner" at most electronics parts stores, and it will generally cost in the \$3-5 range.

Most of the tuner cleaners have a long tube (usually red) that fits on the spray nozzle to direct the cleaner exactly where you want it. Then, disassemble the keyboard and carefully spray a SMALL amount of cleaner directly on the mechanical part of the switch. Be SURE you direct the spray on the mechanical part of the switch. Some keyboards use a "rubber spring" instead of the usual metal one, and you MUST get the cleaner into the mechanical switch that is underneath this rubber spring for it to do any good. Work the key to get the cleaner distributed into its working parts. Then again spray a SMALL amount of cleaner into the switch. This second application will help remove any dirt that was loosened. Most of these cleaners contain a small amount of lubricant that will also help improve the switch action.

In most cases, you will probably not need to remove the key tops from the keyboard to get at the switch, but if you do, be VERY careful because they can be easily broken. If you have spilled something sticky on the keyboard, you may need to apply the cleaner several times to free up a key. I have successfully used this technique to fix a keyboard that I spilled something on, but it does require some care and patience.

Keep an old rag handy to wipe up any excess cleaner. Although an excess of most cleaners won't harm anything (they evaporate quickly), it pays to be careful. Also be SURE to resist the temptation to "clean" the other keys on the keyboard if they are working properly. This is the old "If it ain't broke, don't fix it" philosophy. You can cause NEW problems by getting dirt into otherwise clean and working switches, and then you will have to repeat the process to fix that one.

If you have any qualms about doing this kind of repair, my previous advice still applies: When in doubt, don't!

ROM Upgrades

Although Zenith computers are generally quite compatible with their IBM counterparts, there are occasions when you may find it necessary to upgrade the system ROM in your computer. Sometimes an updated ROM is required to fix a bug in a ROM "program", and sometimes it is required to add a new feature. Despite some opinions to the contrary, all computer manufacturers, including Zenith and IBM, make periodic changes to their ROMs for both of these reasons. And in order to have some of these bug fixes and new features, I have included this as part of what I consider to be routine maintenance.

For example, let's say you wanted to add one of the newer 101-key (or "en-

hanced") keyboards to your Z-151 computer. The 101-key keyboard was introduced by IBM in 1987, and it is easily recognized by its 12 Function Keys instead of the previous 10. But before you can use it on an "older" computer (e.g. the Z-151 or the IBM PC), you MUST have a ROM that can work with that particular keyboard. In the particular case of the '151, you will almost certainly need to buy a new ROM if you want to use this newer keyboard.

Another similar situation occurred when I wanted to run Zenith's OS/2 operating system on my Z-248. I bought that computer over two and a half years ago, long before OS/2 was available, and my ROM version was 1.8D. I had to upgrade to the then current ROM (2.1A) to run OS/2, and I considered this an enhancement. As a side benefit, that newer ROM version also allowed me to use a 101-key keyboard on my '248. You can see what ROM version you have on a Zenith computer by using the CTRL-ALT-INS key sequence.

Sometimes a bug in the ROM can also cause software problems. This kind of problem usually manifests itself by causing unexplained system freezes or a program's inappropriate response to a specific command. But if you have that kind of problem, do NOT jump to the conclusion that a new ROM will fix it -- it could also be a problem in the application software you are using.

When you do find a problem with an application where it does not seem to be working "right", be sure to check its documentation first. It may be that you don't understand how to use a certain feature or command or you are using it incorrectly. Software manufacturers say that about 80% of their reported "software problems" are simply the result of a user's failure to read the manual. If you don't find the answer in the documentation, then I suggest you call or write to the software manufacturer. Many software manufacturers have technical support lines to help you with problems, although many of them are not toll-free. If the manufacturer's technical support indicates that your problem is not related to their software, then you may have a problem that is related to some non-Zenith hardware change that has been made to your system.

Speed-up or "turbo" kits used to increase a computer's clock speed especially seem prone to causing strange problems, particularly at the higher speeds. If a program runs at your computer's "normal" speed, but not at the higher speed, it may still be a program problem because some programs, especially games, use a form of copy-protection that is speed sensitive. Or it may be caused by some hardware incompatibility inside the computer (including the speed-up kit). Or, you may need a ROM upgrade to fix the prob-

lem. However, if a program runs satisfactorily at the computer's normal speed, chances are that a newer ROM will not fix the problem.

If, after going through all that, you are convinced that there is a problem in the existing ROM, the last step is to call, visit or write to a Heath/Zenith Computer and Electronics Center. They are tasked to provide support for all Heath and Zenith computers, and they should be able to help you with most problems. When you have a problem, be sure that you have all of the appropriate information they will need to help you. That includes the model of your computer, the DOS version you are using, the contents of your AUTOEXEC.BAT and CONFIG.SYS files plus a detailed list of the hardware additions (e.g. hard disks, memory boards, etc.) in addition to the specific program name and version you are having trouble with. If someone at the store is not able to help you, they can check with Zenith to help isolate the problem and get back to you.

I should specifically note that this kind of technical support does NOT include help in any programming language. Although you will find the sales staff is generally quite knowledgeable in Zenith computers, computer hardware, and various application programs; many of them may not know (and aren't expected to know) any programming language. Don't expect to get help writing a program in any language, although you might get lucky and find someone who understands the language you are using. For that kind of problem, you are pretty much on your own, but you may be able to get some help from the manufacturer of that compiler.

Maintaining Your System

For the most part, it is easy to maintain your computer and its peripherals. Much of the routine maintenance requires nothing more than a little cleaning, some common sense, an idea of some "kits" that can help you, and some care and patience. I have also mentioned some ideas on fixing routine problems that can occur on your system. If you feel uncomfortable in removing the cover from your system or any other disassembly, perhaps you can talk a knowledgeable friend into helping you do it the first time. It usually only requires a screwdriver, and it really is easy if you follow the instructions in the owner's manual. A little care and patience goes a long way, and remember to take your time. Even if you don't know much about a computer and its electronics, you can help prolong its useful life by performing periodic maintenance.

In Summary

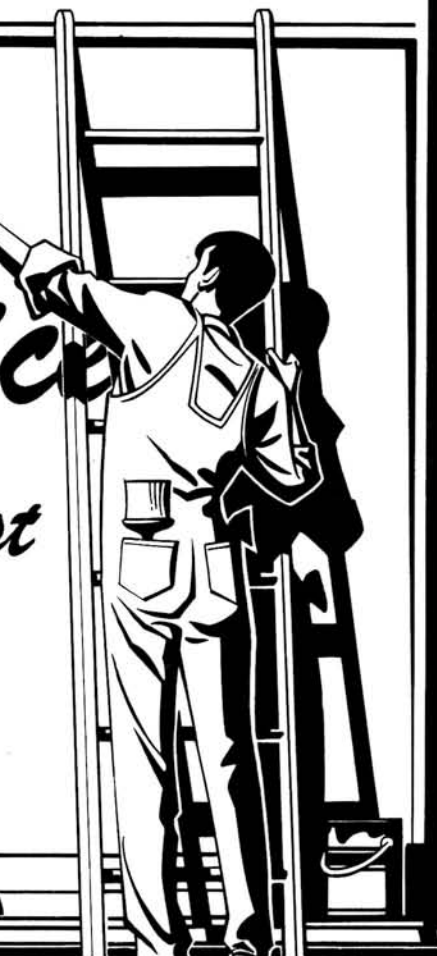
This concludes the POWERING UP series of articles that I hope you have

Continued on Page 32

Painter's Apprentice

Let's You be an Artist
with Your Z-100

Gregory D. Elder
2trs 4301-A
USAFA, CO 80840



I've always loved using my Z-100 microcomputer. I think it is still one super machine, especially when you consider its graphics capability. I must admit, though, that at times I have been envious of Macintosh computers. After all, those pull-down menus, icons, and mice are pretty nifty. Why can't the Z-100 have a software package like that?

As if in answer to my desires, Russell Nelson and Patrick Naughton have written a program for the Z-100 which implements the above features. The package is called Painter's Apprentice (PA). It is a great graphics package similar to MacPaint for the Macintosh. Even though the program has been around for about 3 years, most Z-100 owners I talk to have never heard of Painter's Apprentice. Part of the reason for this has to do with the fact that Heath/Zenith no longer sells this package. I suppose that when Heath/Zenith discontinued the Z-100, they decided to stop supplying Z-100 specific software (and that's a shame). I bought my copy of PA from Heath about 2 years ago for \$79.00. You can still buy it today, however, directly from one of the authors for only \$35.00. In my opinion, that's a great deal for this superb package. I'll supply the specifics on ordering PA at the end of this article.

Getting Started

In order to use PA, you will need the

following: a Z-100 with at least 192K of memory, MS-DOS version 2.0 or higher, a color or monochrome monitor, a Microsoft or compatible serial mouse (I use a Logitech mouse), and an optional dot-matrix printer. Before running PA, the proper print driver must be installed. PA comes with print drivers for the MPI99, Okidata U83, and Epson MX-80 printers. Russ Nelson was kind enough to provide me with the assembler source code for the print driver. This allowed me to create a print driver for my Star Micronics SG-10 printer. You should be able to do the same if your printer is not compatible with one of the three supplied drivers. When PA begins, it looks for a file called PAINT.PRI. Therefore, to install the correct print driver, all you need to do is rename the appropriate driver to PAINT.PRI.

After setting up the print driver, you need to load the software which controls the mouse. PA comes with a program called ZMOUSE — a Z-100 specific mouse driver for a Microsoft serial mouse. As I already had a Logitech mouse, Russ Nelson provided me with a driver he wrote specifically for the Logitech mouse called LMMOUSE. (By the way, the mouse must be connected to the J-2 serial port on the Z-100). The mouse software is easily loaded by typing the program name at the MS-DOS prompt. At this point, you can begin a PA session.

To begin PA, you simply type

```
PAINTER <RETURN> or  
PAINTER filename <RETURN>
```

Filename would be the name of a PA file you had created in an earlier PA session. If you do specify a filename on the command line, PA will automatically load that file when your session begins. Once PA is loaded, your screen will appear as shown in Photo 1. At the top of the screen is the menu line. Below the menu is the title box. This area displays the name of the image currently being edited. If you have not named the image, then NO-NAME will be displayed. The canvas is located directly beneath the title box. This is the area in which you create and edit images. Finally, the left-hand side of the screen displays the icon boxes. These boxes display the "tools" PA provides for your use in creating images. The bottom left corner of the screen shows the current fill pattern in effect.

Using the Mouse

I first began using a mouse in 1979 while working with a text processing system known as the On-Line System (how original). That system, by the way, ran on a large mainframe computer. Since then, I have always found that a mouse can make computer applications so much easier to use. Such is the case with PA. You use the mouse to move the pointer on the screen. The pointer appears either as an arrow or as one of the tools shown

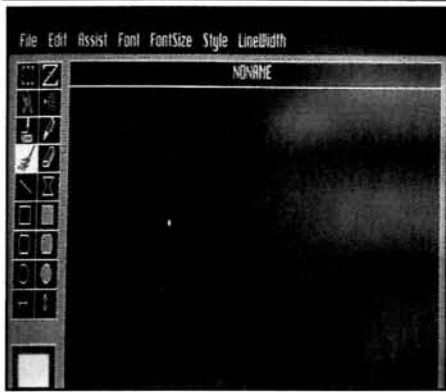


Photo 1
Initial PA Screen

in the icon boxes. It all depends on where you place the pointer. Specifically, if the pointer is positioned in the menu line or icon boxes, it will assume the shape of an arrow. While in the canvas, however, the pointer assumes the shape of the current icon tool in use.

Simply speaking, you only perform two basic operations with the mouse — selecting and dragging. Selecting means choosing an item from the menu line or a new tool from the icon boxes. For example, to select the pen icon moves the pointer to that symbol in the icon boxes. Then click (press) the left mouse button. At this point, the pen icon has been chosen. When you move the pointer back to the canvas, it will assume the shape of the pen icon. The other mouse operation, dragging, allows you to use the current icon tool or to move through a menu. You drag by holding down the left mouse button while moving the mouse. From the example above, dragging the mouse allows you to draw freehand lines on the screen with the pen icon. When you release the left button, you can still move the pen in the canvas, but it will not draw.

Icons

Confucius said "a picture is worth a thousand words." And as Macintosh owners are well aware of, icons (pictures) easily convey their use without words. PA has 18 icon boxes providing tools which make creating images easy. Here are brief explanations of some of these (refer to Photo 1):

- The selection icon appears as a dotted box. This icon allows you to select portions of images for moving or editing.
- The text icon appears as a big letter "Z". This icon lets you use the keyboard to enter text onto the canvas. PA provides a variety of fonts, font sizes, and styles to use. (More on this latter).
- The scroll icon appears as a pair of walking fingers. This icon allows you to scroll the canvas up, down, and sideways. (The canvas is three screens large).

- The air brush icon appears as a spray pattern of pixels. This icon lets you "spray paint" using the current pattern.
- The paint area icon looks like a paint roller. This lets you paint (fill) an area with the current pattern.
- The pen icon, which looks like a pen, lets you draw freehand lines on the screen.
- The brush icon (obviously, looks like a paint brush) lets you draw freehand lines on the screen using brush shapes. PA has 32 different brush shapes from which you can choose.
- The eraser icon (looks like one of those rectangular rubber erasers you used in grade school) lets you remove parts of your image.
- The line icon allows you to draw straight lines between two points.
- The polygon icon helps you to draw geometric shapes in a freehand manner.
- The other geometric icons (rectangle, rounded rectangle, and oval) let you easily draw those specific shapes. These icons also make use of rubber banding. That means the particular shape can be enlarged or reduced on the canvas according to how you drag the mouse.
- The final icons (horizontal arrow and vertical arrow) constrain movement in a certain direction. These come in handy when you want to draw straight lines or move other icons in a straight manner.

I find the combination of the mouse and icons to be very efficient. Simply position the mouse to point to the desired icon, click the left-hand mouse button, and then drag the mouse to draw whatever patterns you want on the canvas. It's as easy as one, two, three.

Menus

The menu line at the top of your screen gains you access to seven different menus: File, Edit, Assist, Font, FontSize, Style, and LineWidth. To select a menu, simply position the pointer to a particular item and hold down the left-hand mouse button. A pull-down menu will appear on the screen listing commands for that menu. Photo 2 shows the File menu. As you move the pointer up and down the menu, the command you are pointing to is highlighted. To select a specific command, you simply release the mouse button when you have that command highlighted.

The File menu provides some basic "file" commands. Some of these commands let you load an image file, save an image to a file, and print the image currently displayed on the canvas. This menu also lets you change the default disk drive, scratch (clear) the image currently shown on the canvas, and restore an image to the state it was originally saved to

disk.

The Edit menu provides commands for manipulating images (or selected parts of images). For example, you could use the select icon to select a certain portion of an image. Then, you could use the Copy command from the Edit menu to copy that part to another area on the canvas. Some other commands available from the Edit menu allow you to invert images, to flip images horizontally and vertically, and to rotate images by 90 degree increments.

The third menu, Assist, provides assistance with drawing or revising images. For example, the Grid command within Assist constrains movement on the canvas along the lines of an invisible grid. The Magnify command enlarges an area of the canvas to allow detailed drawing or editing of images. In addition, you can use Assist to delete or insert individual pixels on the canvas. You can even draw symmetrical shapes with Assist by using the Brush Mirror command. (This command mirrors your brush strokes on the canvas.) Finally, Assist also has a Help command and a Quickies command. Quickies simply lists shortcuts for PA, i.e., combinations of mouse buttons or control keys which let you bypass the menus. One example of a "quickie" is using the <HELP> key for help, rather than dragging the Assist menu for the Help command.

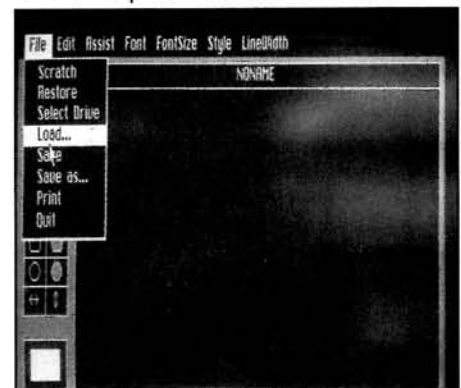


Photo 2
PA File Menu

The next item in the menu line is the Font menu. This menu simply allows you to determine the typeface to use with the Text icon. PA comes with an assortment of fonts, such as Potsdam, Norwood, Roman, Roman Bold, and others. Photo 3 shows some sample fonts as they appear on the screen. Figure 1 is a printout of some of the more exotic fonts (Splash, Fourth of July, Christmas, and Valentine) using a Star Micronics SG-10 printer. The next two menus, FontSize and Style, change the size and style of the font currently in use. FontSize allows you to vary the size of the current font from about 9 points to 72 points. (A point is roughly 1/72 of an inch.) Similar to FontSize, Style allows you to change the style of the current font. Styles available in PA consist of

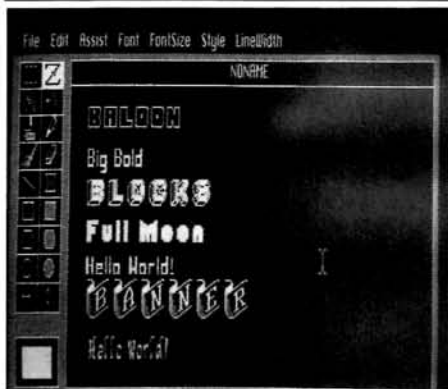


Photo 3
Sample PA Fonts

plain, bold, italic, underline, outline, and shadow. Photo 4 illustrates each of the font styles available with PA. By the way, the style menu also controls the alignment (left, center, right) of text typed onto the canvas.



Photo 4
PA Font Styles

The final menu, LineWidth, enables you to choose between four different line widths. These widths only have an effect on lines and geometric shapes.

When I bought PA from Heath, it came with an 8-1/2 x 11 inch size, 50+ page manual. The manual is very thorough, easy to read, and contains a number of diagrams to help explain the program. I find, however, that most of the icons and menus are fairly obvious and that I rarely need to refer to the manual. (I guess you would say PA is user friendly). Now that Russ Nelson is selling the program himself, the documentation comes on the distribution disk for the user to print. I would imagine it contains the same information as the manual Heath provided. The PA distribution disk contains some sample images. In addition, about two years ago, Russ Nelson provided me with some disks which contained more sample images and extra fonts. I am not sure if he regularly provides these extra images and fonts when he distributes PA today, or if he sells those disks separately. Photo 5 shows a PA image as displayed on the computer screen. Figure 2 is the same image as printed on a dot-matrix printer. Some of the samples were cre-

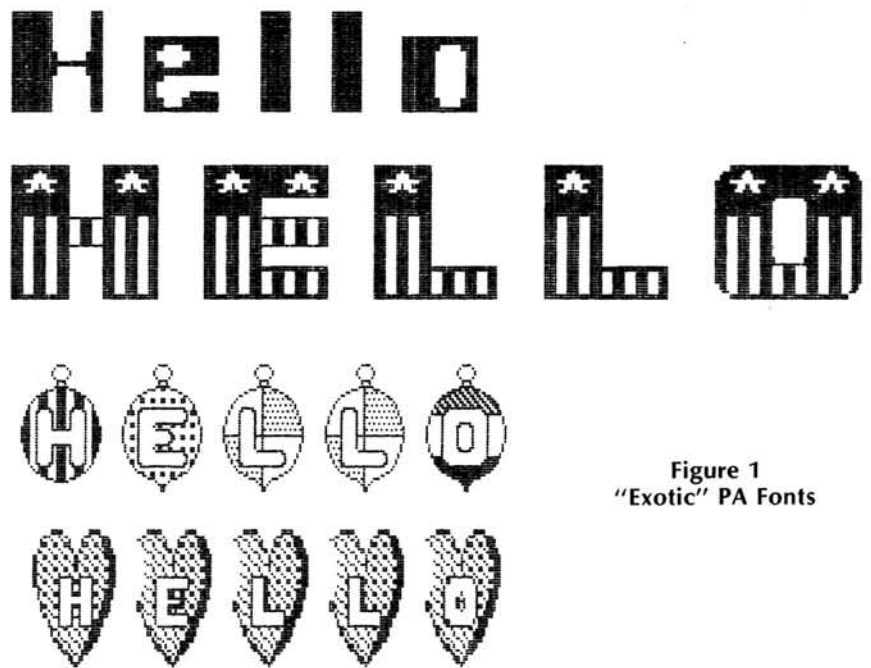


Figure 1
"Exotic" PA Fonts

ated by some very excellent computer artists, or were photographs digitized into PA. I have read about artists using computers for their artwork. For example, the comic book, "Shatter", was completely created on a Macintosh using a MacPaint-like program.

Overall, I found PA an easy program to use. It won't make you a better artist (I still am only good at drawing stick men),

but it sure will showoff the capabilities inherent in the Z-100. There are a couple of features I wish PA provided. One feature missing from PA is color. PA only draws images in black and white. Maybe if there is enough interest in the program, Russ can modify it to support color. Also, it would be nice if it could import images created with other systems (like MacPaint). (After writing this article, I discov-

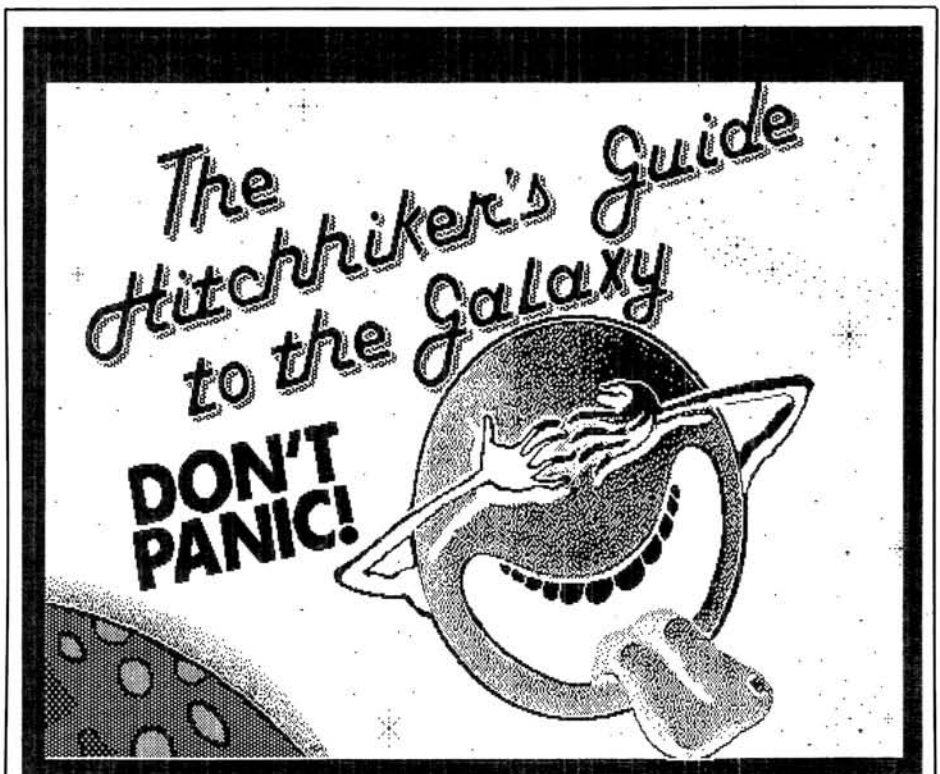


Figure 2
Printout of Image from Photo 5

Continued on Page 31

Saving Memory With TSR Programs

Dat Swayne
HUG Software Engineer

Here is a trick that can save hundreds of bytes of memory if you use several small TSR (Terminate but Stay Resident) programs. Part of this trick was revealed by Joseph Katz in his "Mainstream Computing" article in the April 1987 issue of REMark. However, he was incorrect in some of his findings, and seemed to be unaware of what the trick actually accomplished. You may not be aware that for each TSR program that you load into memory, DOS also stores a copy of the "environment", which contains your PATH statement and other information. If you use AUTOEXEC.BAT to load your TSR programs, it is possible to empty the environment before you load them, and then "refill" it afterwards. To do this, you must first place all of your TSR programs in the root directory. Then set up your autoexec.bat file like this:

```
SET PATH=
SET COMSPEC=
--
(Load TSRs here)
--
PATH=(your path)
SET COMSPEC=C:\COMMAND.COM
--
(other AUTOEXEC commands here)
--
```

The first two lines in this example empty the environment. Whenever you issue a SET VARIABLE= command to DOS, it not only removes any definition assigned to that variable from the environment, it also removes the variable itself. The only two variables in the environment at boot-up are PATH and COMSPEC, and with those removed, the environment is empty. After your TSR programs are loaded, you can reinstall the PATH and COMSPEC variables and define them as required.

When DOS stores the environment in memory, it also stores a four-byte marker at the end of the environment, and the path used to load the TSR. For example, if you load HEPCAT.COM (HUG disk no. 885-3045) from a directory called BIN on drive C:, the marker plus C:\BIN\HEPCAT.COM would be stored in memory along with the HEPCAT program itself. So you can see that you save memory if you put all of your TSR programs in the root direc-

tory. You may also be able to see that you can (believe it or not!) save memory by shortening the name of each TSR. In fact, since DOS always allocates environment memory in multiples of 16 bytes, you can save 16 bytes of memory per TSR program if, when you load them with the environment empty, the name of each is 4 characters or less. So if you rename HEPCAT.COM to HEPC.COM, and load it with the environment empty, then DOS would store a 4-byte marker plus C:\HEPC.COM in memory, which adds up to 15 bytes. DOS also stores a null character at the end of the program name, so the memory usage is actually 16 bytes. If you were to add just one character to the name, the usage would jump to 32 bytes!

You can also use this trick if you load TSR programs after boot-up. If you have put more variables in your environment than the default PATH and COMSPEC variables, they will have to be removed. (For example, you may have defined your PROMPT, or added a variable required by an application program, such as SET INCLUDE=DATA.DAT.) You can enter SET by itself at the command prompt to list your environment variables, and then set each one of them to nothing. Then you can load the TSR, and then restore the environment.

There is one unfortunate side effect when you load TSR programs this way. Some of the programs available that list TSRs in memory are not equipped to handle an empty environment. For example, MAPMEM (a public domain program available on the HUG BBS) lists the TSR programs with no names, and System Sleuth™ (a commercial diagnostic utility) shows a "happy face" symbol as the name of each TSR. I have devised a fix for MAPMEM, which you can install if you have Turbo Pascal (MAPMEM was written in Turbo Pascal).

To make the patch, locate the portion of code that looks like this:

```
{find end of the standard environment}
i := LongPos(#0#0, e^);
if i = 0 then begin
  {something's wrong, exit gracefully}
  Owner := "";
  Exit;
end;
```

Change it to look like this:

```
{find end of the standard environment}
i := LongPos(#0#0, e^);
```

In other words, remove the test for i = 0. Then recompile the program, and it will work correctly with TSR programs loaded with an empty environment. This patch has been tried on MAPMEM versions 1.6 and 2.0, which were compiled with Turbo Pascal version 3.01. *



"HE DOESN'T KNOW A RAM FROM A ROM AFTER HE HAS SOME RUN!"

...And They Sold Them to Other Computer Manufacturers!



Denton Bramwell

Director, Kit Computers

I'm not fooled at all by the genteel bearing and the charming trace of an Old World accent. The natty clothes and impeccable manners don't take me in a bit. Underneath it all, Saied (pronounced Sah-eed) is a torturer. Whether you call him Saied, the Terrible or Saied, the Magnificent probably depends on whether you are selling disk drives to Heath, or buying drives from Heath.

You see, last year Saied tested about \$2 million worth of drives and controllers to the point that they were ready to be tossed out with the trash. He tortured them with heat, cold, humidity, and an exercise regimen that caused most of them to simply give up and go home. If you're a disk drive vendor, you probably think of him as Saied, the Terrible. If you're using a Heath or Zenith disk drive, you're more likely to think of him as Saied, the Magnificent.

"About 10-15% of the new hard drives that come in for testing meet all our criteria with the first sequence of testing," said Saied. "Another half to two-thirds make it after several months of working with the vendor on necessary improvements. The rest simply never make it. When we're done with a drive, we have very good confidence in its durability and data integrity."

What kind of tests does Saied perform on disks and controllers for Heath and Zenith? Tom, Greg, and Mohsen, three engineers in Saied's department filled me in:

"The first thing we do with a hard disk is simply put 10 to 12 disks on a room temperature write splice test. Here we do sequential, random, and pattern read/writes until we have accumulated 10^{12} read/writes on each drive. Our criterion is NO hard read/write errors, and that alone is a reasonably rigorous test. It washes out about half the candidates, and we haven't even started with the really tough tests."

10^{12} is a hard number to comprehend.

I sat at my kitchen table, and, with the help of my wife, counted out 1000 grains of wheat. According to the calibrations on the side of a lab beaker we happen to have lying about, those 1000 grains amounted to about 30 milliliters. A standard football field is 53.3 x 120 yards, including the end zones. 10^{12} grains of wheat will cover one to a depth of 18 feet. That's a lot of wheat. It represents a lot of read/write cycles.

If that set of drives passes the preliminary test, it is ready for phase two. Phase two is a tough test. At room temperature, a drive has it fairly easy. It is doing its reads and writes at the same temperature, so it shouldn't have any problem with expansion and contraction of the mechanism or platters. The seals aren't really overly stressed, because normal humidity in a heated or air conditioned building is set for human comfort, more or less. And the head motor isn't operating against a major heat load, so it is not very likely to fail. The test chamber is designed to change all that."

"In the test chamber, we estimate that we are accelerating failures by about a factor of five", said Tom. "We cycle both the heat and the humidity, and operate the drive inside a computer. That leads to temperature excursions up to 50° C. The combination puts some significant stresses on the drive."

"If, for example, the seals are not perfect, we will get a humidity leak, and eventually see a head crash. By writing when the drive is cold and reading when it is hot, and by doing the reverse, we find out if the manufacturer has paid attention to his thermal design. If he hasn't, the drive will lose its ability to find the data tracks, and the drive will fail. Heat is the enemy of head motors and voice coils. If the thermal design there isn't good, we will find that, too."

"During all of these tests, we swap controller cards around," Greg told me.

"We want to make sure that the controllers will work on all the hard disks, and that the combination will play in different Heath/Zenith computers. It would be naive to think that you could just go into the market and randomly put together a computer, controller, and disk that work properly together."

Generally, it is accepted in the industry that a winchester drive and controller provide an average of no more than 1 recoverable error in 10^{10} read writes, and no more than one non-recoverable (hard) error in 10^{12} read/writes. Saied's group strives for ten times that quality — less than one hard error in 10^{13} read/writes. Try thinking of the football field covered to a depth of 180 feet, rather than 18 feet.

Of course, practically all disks have some bad spots, and part of normal procedure is to map out the bad spots, and then not use them. Sort of a reasonable rule of thumb is that you can have about 1 error per megabyte of storage, but that is for ordinary drives. If it is going to be sold under the Heath or Zenith label, the critical first four cylinders must be error free.

"Once a drive has been tested, we're still not done," Mohsen told me. "Samples of the drive will be sent to our RFI group to make sure that it complies with radio/television interference regulations, some will be selected for in-plant use, and some will be stored as reference items, in case we ever need to check them against a new batch. And then there is all the record keeping."

"Record keeping?", I asked.

"Oh yes — once a drive is qualified, the design is frozen unless we consent in advance to the changes", he assured me. "We get an advance copy of every engineering change order the vendor wants to put in place. Every one is reviewed, and must be approved before we will accept shipment. We check every shipment of

drives that comes in, and if it has a change that we don't recognize, the drives go back. If a vendor wants to make a significant change, we very often have to re-qualify the drive."

"You know," Saied added, "Some people think they can simply look at the drives we buy, and then go out and buy the same model from the same vendor, and get the same quality. But it doesn't work that way."

"It doesn't?" I said skeptically. "It sounds like a pretty good plan to me."

"Just think about it," he laughed. "What do you think vendors do with the drives I reject? They don't go into the trash most of the time. Remember the old coffee commercial, where the coffee broker says that last year, he rejected so many tons of beans, and those beans were sold to someone else? The same thing happens in the drive business. We

get the cream, and put our "Heath" or "Zenith" name on it. Some of what ends up sold at discount prices is pretty good, and some of it isn't. What is certain is that we get our choice first, and we take the best we can find."

I had to admit that he had a point. I later called our Parts Replacement department, and asked how many warranty replacements we had made on the first drive Saied had qualified for Heath. The



Photo 1

Saied personally inspects each drive model before telling the manufacturer "No Problem!"

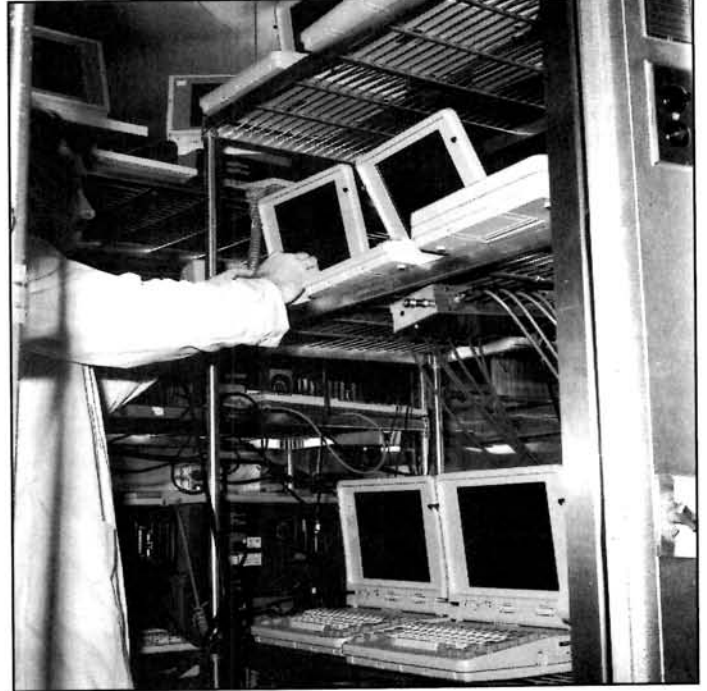


Photo 2a

The infamous "Environment Chamber." Here's where most drives take their "last breath!"

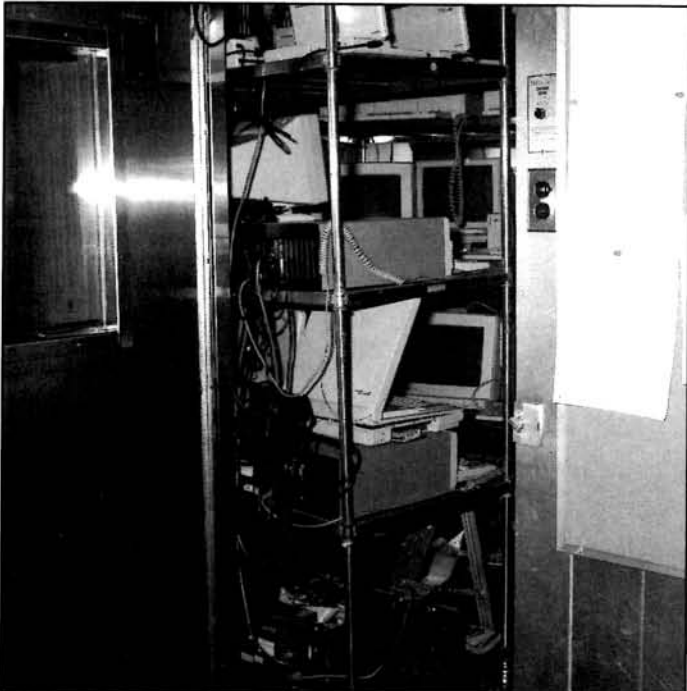


Photo 2b

Another view of the environment chamber. Drives are tested in actual Zenith computers, not specialized test fixtures.

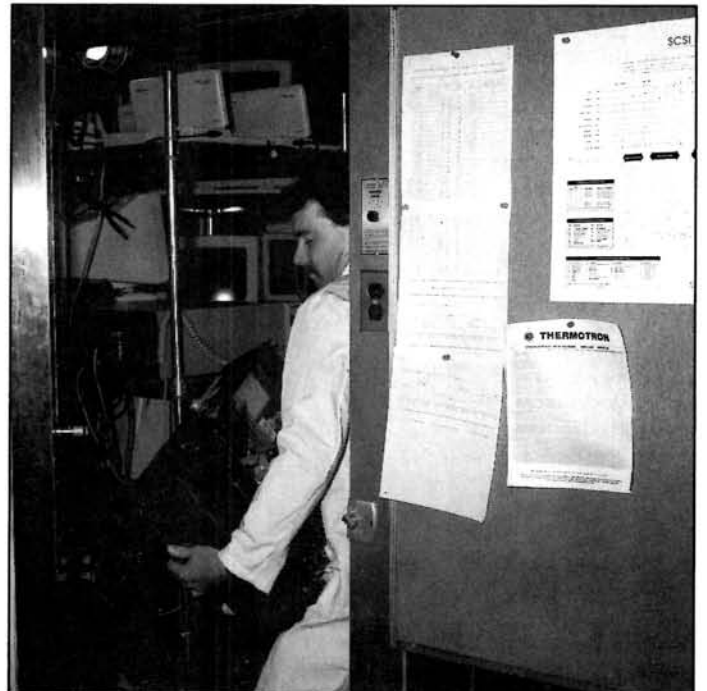


Photo 3

Another "Dead Puppy".



Photo 4

The manufacturers of these drives can be proud to say that they passed Saied's grueling obstacle course!

answer was a fraction of a percent of what we had sold, and then our parts person added, "Of course, that includes everything, not just warranty. You probably have a few being drawn for someone's department use lumped in with that. I can't tell you what the real failure rate is, but it isn't much."

"You know," Saied said, "Not many people know what we put drives

through here, and what it means when we qualify a drive. You really ought to write an article, and let people know."

And so I did.



Continued from Page 27



Photo 5
Sample PA Image

ered that Russ Nelson has a conversion program which will convert MacPaint images to PA images. It will also convert fonts from programs like Fontasy to PA. Mr. Nelson sells this program for \$5.00. At such a great price, \$35.00, I wholeheartedly recommend this program.

Even if you only want to show it to your friends who have Macintosh systems. As I said at the beginning, the Z-100 is still one great computer. I'd like to

thank Russ Nelson and Patrick Naughton for writing such a super program which takes advantage of the Z-100.

To order Painter's Apprentice, send \$35.00 to:

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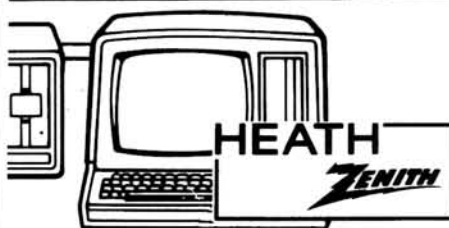
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Related Products

Expanded Public Domain Data Base Display Program

PLOTMWDB is an expanded version of the SAT (SATELLITE) program which is distributed with the Micro World Data Bank II data (MWDB) files. This version is in response to the requests received from users of the original SAT program and MWDB data. Also provided is the INDEXWDB program. INDEXWDB indexes and compresses the MWDB files. This results in compressed data files and considerably improved performance of the PLOTMWDB display program.

The PLOTMWDB program and data files on this disk can be used as-is. PLOTMWDB can also be used with the data supplied on the full MWDBII disks (set of five). The contents of this disk build upon the original set. The full set of five disks contain some 179 thousand data points which describe coast lines, country boundaries, state boundaries, islands, lakes, and rivers. The files provide world wide coverage and contain five levels of detail. The data points are subsets of those found in the three million-plus point Central Intelligence Agency (CIA) World Data Bank II files. The disks also provide several programs, with Pascal source code, for building customized versions of the data files and for obtaining statistics on the files. Also included is a program called SAT.

SAT uses the MWDB II data to generate what is known as a generalized perspective projection. It is called perspective because the image it generates shows you what you would see if you were looking down on the earth from an airplane, satellite, or space vehicle. It is called generalized because it allows you to locate your viewpoint over any point on the surface of the earth and select an altitude between one and 23,000 nautical miles above the earth. Based on the selected location and altitude, it calculates what portion of the surface can be seen and then generates an appropriately projected and scaled image.

A number of changes and enhancements have been made to the original SAT program. Version 2.1 enhancements and changes include:

1. A file indexing program INDEXWDB. This program compresses the data files and provides considerably improved performance.

2. The plot commands can now be sent to several plotters and saved in disk files.
3. A WordPerfect compatible output format is provided.
4. You can adjust the width of the image to match the height adjustment of your CRT.
5. You can control the colors used to display each of the line types. Separate control for the CRT and plotter colors is provided.
6. Control of the grid spacing intervals and elimination of grid lines is provided.

Continued on Page 38

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found useful. This series was specifically intended for a new user of Heath/Zenith computers, although most of the tricks and techniques I have mentioned will work for many other brands of PC compatible computers too. If you have spent the time reading, and working with, some of the ideas presented here; you will find that suddenly you have joined the ranks of the ADVANCED computer users. You may even be considered to be a "power user" by many of your friends because you know more about DOS-based systems and computers than they do.

For those who purchased this series in its book form, I would like to note that you may find a few things have changed since this series was written. Because many things change rapidly in the fast-paced computer business, I have specifically tried to keep many of the command descriptions very general to avoid potential problems with new computers and DOS versions. Still, even the most conscientious writer can only include the latest information that was current when these articles were written.

If you have any questions about anything in this column, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion or comment.

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Laptops, SupersPort 286, Computer Security, PC-DOS Versus MS-DOS, Backups, Mace Gold Utilities

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Laptops. Laptops are the latest and greatest so far as microcomputers are concerned, and more and more people are using them. They are great tools, but like most tools, they can be a double-edged sword. In this article, we will take a look at some of the many uses of the laptop and some of its shortcomings. In particular, I will focus on some of my limited experience (I've only had it a couple of months) with the Zenith SupersPort 286, and I have a couple of suggestions for improvement. If you have used a laptop, you have probably discovered some of these ideas yourself.

Laptops and Security

Perhaps the biggest single advantage of the laptop is that it can provide desktop computing power in a small package. I have found that the SupersPort 286 is quite well designed, and mine has a 40 MB hard drive. However, all of that power and disk space in a small package includes a risk that you may not have thought about. I think about the problem a lot because my mainframe computer specialties include disaster recovery planning and information security. And since I use my laptop to keep notes and write draft reports, there can be quite a bit of client-sensitive information on it from time to time. As a result, I am extremely particular about where I leave it since I do not want it to get stolen. Some might say I'm even very fussy about it (which is true), but I think my clients expect and appreciate this confidentiality and concern. As is so often true, the INFORMATION that I have stored on my laptop is actually more valuable than the unit itself.

Consider the situation where a company provides a laptop computer to everyone on the sales staff with appropriate software to handle tasks like sales calls and contacts (e.g., customer list), scheduling, and perhaps some special software that can generate price quotes on the spot. I have always taken the view that any information on a company-supplied computer system belongs to the company, not to an individual employee who uses the computer as a tool. Regardless of philosophy regarding the exact ownership of this information, it is fairly obvious that it is important to safeguard the information from competitors which may actually provide a company with an important competitive edge. While customer lists may be important, consider what might happen if a competitor happened to get a copy of the software that a company uses to generate price quotes. Then, a competitor could ALWAYS underbid the company, and the competitor would also know the client contacts as well. That is the kind of scenario which must be considered, and protecting sensitive information is the responsibility of each and every member of the sales staff. I have found that it is especially difficult to get many people to recognize that the information stored in a computer is actually far more valuable than any dollar value that can be assigned to the hardware and software.

Although the laptop provides portable computing power for those who need it, one must also recognize the responsibility for having that kind of power available. For those of us who really need that kind of computing power, just be sure that you keep track of where your com-

puter is. The biggest advantage of today's laptops — the portability — is also a disadvantage because it is easier to steal. Do you know where your laptop is right now?

Security and Laptops

Like anything else, security measures can be carried to an extreme. The Secretary of Transportation is now considering an idiotic proposal to ban ALL small computers from airplanes (both as carry-on and checked baggage) in the wake of the Pan Am disaster. Although everyone agrees that in-flight terrorism is a problem which must be solved, banning all small computers is a shortsighted and dumb approach that was probably suggested by someone who really does not understand the problem. Besides, reports indicate that the Pan Am bomb was inside a radio, not a computer. It is more than a little difficult to understand the convoluted logic of why small computers should be singled out in this proposal.

Even if this proposed ban was extended to include all electronics — tape recorders, radios, etc. — it cannot possibly be effective in deterring terrorism because there are any number of other ways that a bomb could be smuggled onto an airplane. And yes, I have more than a passing interest in aircraft security because I do a lot of traveling with my laptop. In fact, one of my "frequent flyer accounts" just exceeded 100,000 miles again, and I have doubts that the individual who suggested the ban on small computers has traveled that much in a lifetime. I am also not interested in a "relaxed ban" that would permit small computers on airplanes as checked luggage because of my

information security concerns mentioned earlier, not to mention the probability that five-thumbed baggage handlers would inevitably want to test the shock limits of the hard drive in my computer.

I believe it is ridiculous to consider a ban like this, especially when it cannot be effective in solving the real problem. Perhaps we should consider a ban on all automobiles because they kill so many people every year — in fact, more people are killed by automobiles each year than have ever been involved in in-flight terrorism. That is the kind of incredible logic which seems to be behind this kind of proposal.

Unfortunately, there is no quick and easy solution to the problem, but I believe that it can be solved. Beefing up the training for airport security personnel is the primary weapon that will be most effective against the problem. Developing new, sophisticated, and expensive "metal detectors" and x-ray systems will not help much because they still must be understood and used correctly. The bad news is that training is expensive, and improved airport security will probably require additional personnel too. It won't be cheap, and passengers will still end up paying for the additional costs, as usual.

Airport Security and Computers

As a result of my frequent traveling, I have observed a rather common occurrence at the airport security checks with some amusement. On nearly every trip, I notice that at least one person going through the security checkpoint is quite concerned about passing floppy disks or a computer with a hard disk through the security x-ray. From what I can tell, there is apparently a rumor that airport x-ray systems can destroy data on a disk, and a few people in airports have told me that x-rays are harmful to the computer as well. While I agree that anything is possible, I have sent my computers (both the Z-171 and the SupersPort) and floppy disks through a wide variety of these airport systems a number of times with no problem. Experts tell me that there is no evidence that the current airport systems can damage a small computer or any kind of disk, and I was also unable to find a documented case where it could be proven that an airport security system caused any kind of computer-related damage. My personal experience agrees with that assessment, and it is also much easier (and safer) for security to scan all carry-on luggage anyway. If you know of a particular brand (or location) of airport x-ray that does cause a problem, be sure to let me know because these kinds of things will probably change quickly in the near future.

The SupersPort 286

I really like the SupersPort 286. I have used it with a wide variety of software,

and there have been no compatibility problems. As I mentioned last month, the only software problem I've had was when Samna Word IV clobbered the hard drive's boot sector, but that is not a Zenith problem. Although this version is a little better than Samna Word III which regularly clobbered my data files, I have seen a wide variety of problems with Samna on various computers, including IBM and Compaq. Samna evidently uses some incredibly "non-standard" programming and file format techniques, including direct hardware access, that are the apparent cause of these problems. I do not think it is appropriate to criticize Zenith, or any other hardware manufacturer for that matter, for a program that exhibits "bad behavior" from both the programming and user perspective. Other than that particular problem, I have found that the SupersPort works fine with Microsoft Word, WordStar, SuperCalc, GEM Draw/Graph/WordChart, and the Mace Gold Utilities running under Zenith MS-DOS 3.3 Plus.

The SupersPort has a CGA display capability, and although it is quite easy to read under virtually all lighting conditions, I think that Zenith should have included at least an EGA display on this computer. After all, this IS an 80286 system, and it seems to me that it also should have an EGA display like the TurbosPort 386. If Zenith decides to implement this suggestion in future models, I would also suggest that they develop an upgrade kit for those of us who already have this system. Or perhaps Heath might want to do that. In any case, I volunteer to install and test this upgrade when (if?) it is available.

The disappearing cursor... Until an EGA display upgrade is available, there is also the problem of the disappearing cursor — a common problem on many laptops. I have found it somewhat difficult to find the cursor after I have been scrolling through a file with a word processor. The problem is not quite as bad with WordStar 5.0 because you can change the cursor size to make it more visible. I have tried Pat Swayne's NOBLINK program and several other tricks to attempt to fix the problem, but many programs reset the cursor, and it still becomes nearly invisible. Perhaps Zenith could implement some kind of cursor-configuration code in the ROM SETUP program to help correct the problem.

All in all, the SupersPort is an excellent laptop computer. With an EGA display that would eliminate the disappearing cursor problem, it could truly be a Super laptop.

Backups

Although laptops are generally constructed to be carried and used (and abused to some extent), a wise and careful owner will take extra precautions to

ensure that data is not lost during traveling. If your system only contains floppy drives, all you need to do is copy new files to a backup floppy with the COPY or DISKCOPY command before you power off the system. If your laptop contains a hard drive, especially a large capacity unit (e.g., 40 MB or larger), you need to take some extra precautions, just in case. As I mentioned last month, the Samna IV word processor destroyed the boot sector on my SupersPort's 40 MB hard drive when I was in New York, and it was fortunate that I found a way to get around the problem. Perhaps the best way to talk about backups is to discuss the various ways that I use to back up the hard drive on my own laptop, although these same ideas could also be used on a desktop system too.

The approach that I use for hard drive backups on all my systems relies on the SYSTEM DISK and DATA DISK concept that I have mentioned a number of times in various articles. I have implemented this concept on my SupersPort by using the PART command to create two partitions: drive C (the system disk) has about 22 megabytes, and drive D contains the remainder — about 18 megabytes. To keep things simple, drive C only contains the various software that I need for my work, such as word processors, spreadsheets, and graphics packages. I do not use drive C for any data files for any program which makes backups much easier as you will see. On the other hand, drive D contains data files only, and I do not have any programs on that drive.

Then, I do a complete backup on drive C, and there is no need to back it up again unless I install a new version of MS-DOS or an application program. In other words, nothing changes much on drive C, and there is really no need to back it up again until I add new software or update an existing program. One user told me there was really no need to back up that drive because I can always install all of the programs again. While that sounds good in theory, it is obvious that he never spent an entire day struggling through all of the install programs for some of the software I need. I do not wish to repeat that experience any time in the near future, and it is much easier to back it up than to struggle through a bunch of installs.

The major reason that I had to install each program on the SupersPort was because I added a wide selection of printer drivers so that I would be able to use about any printer I was likely to find. In addition, the SupersPort 286 only has CGA display capability, and since both of my desktop systems have EGA, I could not simply use one of my desktop system backups to "restore" the programs that I need. And since both of my desktop systems have color, I quickly learned that some colors are invisible on the Super-

sPort's LCD display during the installation process. It was also apparent that, for some reason, different programs had different invisible colors. And a few programs, like Samna IV, cannot be configured under any conditions that I have found to display special features, like bold and underline, so I have to make a guess and then print a file to see what the print enhancements really are.

On the other hand, some thoughtful software manufacturers, such as Borland, have a special configuration option for LCD displays, and Quattro works just fine on the SupersPort. By the way, I found during the first few weeks I had the SupersPort that I had to do a complete backup each week because I was trying to configure some programs for the most legible display. Microsoft Word, WordStar, and Quattro were the easiest programs to set up on the SupersPort. So much for drive C; now let's take a look at some easy ways I use to back up files on drive D.

Drive D contains all of my data files, and I back it up quite frequently, sometimes once or twice a day, depending on what kind of work I am doing. It is easy to keep a floppy disk in drive A, and when I finish a major update to a file or group of files, I sometimes use the Profinder "shell" program (supplied with WordStar versions 5.0 and 5.5) to execute a simple copy command to copy the "marked" or "tagged" files to drive A. There is also another easy way to do this, especially if you use subdirectories to organize your projects like I do. Here's how that works.

The root directory on my drive D does not contain any files, only subdirectories. Each subdirectory has a name associated with a project I am working on, such as \REMARK, \POW2 (Powering Up Volume 2) or \XYZ (for XYZ Company). In most cases, I don't keep a lot of "extra" files on the SupersPort, partly for security reasons and partly because I usually transfer most "completed" files to one of my desktop systems after a week of travel. In all cases, I take care to ensure that ALL files that I need to transfer between two systems are always backed up on a floppy before I power off a system. By doing that, I always know that the most current file for any given project that I work on with the SupersPort or Z-386 is always on a floppy. Then I don't have to waste time trying to figure out where the most current file is because it is always on a floppy with the appropriate label.

This technique works especially well on the SupersPort because it has a 1.44 MB 3.5" floppy drive, and I try to keep each subdirectory on the laptop small enough so that one floppy is sufficient to back up each subdirectory. And my Z-386 has a 1.44 MB floppy drive which makes it easy to transfer files between systems.

If you don't have a shell program that

makes it easy to track, tag, and copy files, you can also use the COPY command to make backups, but if you have a current DOS version, there is an easier way if you consider what types of backup copies you may need.

Types of Backups

There are really two types of backups: a complete backup and an incremental backup. The COMPLETE BACKUP is defined as a copy of all files, including system and hidden files, on a floppy disk or hard drive partition. Sometimes a complete backup is also called a "full backup" or an "image backup," depending on the software used. Regardless of what it is called, the important point is that ALL files are copied to a secondary media, such as tape or a floppy disk. In a floppy disk system, a complete backup is easily performed with the DISKCOPY command. In a hard disk system, you might use the BACKUP command that is included with all DOS versions.

The INCREMENTAL BACKUP is defined as a copy of only the files which have changed since the last backup. In this context, a newly created file is considered to be a "changed" file because it did not exist when the last backup was made.

The capability to perform an incremental backup relies on two factors. The first factor is that the computer's operating system (e.g., microcomputer DOS or mainframe MVS) automatically sets a "flag" in the disk directory when a file is originally created or when it is changed. This flag, which is technically called the Archive Bit for both micros and mainframes, is reserved for this purpose and is used by backup software to determine which files have been created or changed since the last backup was taken. The second factor is that the Archive Bit is "reset" (i.e., the file is "unflagged") by software when the file is backed up.

I make no claim for originality on this approach because it has been used on mainframe computers for years, and it is the basis for much of the disaster recovery planning that I do. In any case, let's take a look at how you can benefit from this approach. Then, I'll show you some ways you can do it on your own microcomputer system.

It's no secret that taking a complete hard disk backup usually takes a lot of time and computer resources, and for that reason, many people simply ignore the problem, even in mainframe systems. Unfortunately, the only real guarantee that you have with ANY hard drive is that it will eventually fail, sooner or later. As a result, the only protection you really have against these failures is to make backups on a consistent and periodic schedule. Although it is easiest to recover from a hard drive failure if you have a current com-

plete backup, the time required to make a complete backup is significant, and many times, the whole concept of backing up a hard drive is ignored for that reason. Sitting in front of my computer for 20 or 30 minutes and plugging in floppy disks during the backup process is what I call "idiot work," and is not productive until something happens to the hard drive. Still, I have had about half a dozen complete hard drive failures over the last seven years, and these backups have saved me more than once. I used to take complete backups once a month and incremental backups once a day; now I usually take a complete backup once a week, followed by a series of daily incremental backups as required, depending on how much writing I do.

The Backup/Restore Procedure

Taking a complete backup is easy now because I use a tape backup system, consisting of the Imager Board and a VCR, to back up my production Z-386 system. During the weekly complete backup of my data partition (drive D), I usually read a magazine so that I can keep an eye on the system while the backup is running. After that, I run a simple batch program that cycles through all of my subdirectories to reset the Archive Bit using the "ATTRIB -A *.*" command that is available in current DOS versions. By the way, I just received an update notice indicating that the latest version of the Imager software can now reset the Archive Bit during the backup process, so I may be able to delete my batch file. Now I have a complete backup of all my data on drive D, and the Archive Bit for each and every file on the partition has been reset or cleared.

At the end of each work day, I use the XCOPY command to copy all files that have been created or changed during the day to a floppy disk. The reasons I use XCOPY are because: it is easy to copy only changed files to a floppy, it preserves both the subdirectory and file names, and it resets the Archive Bit when a file is copied. A single floppy disk used this way lasts for a long time, even a standard 360 K floppy. Even though I do a LOT of writing, it is rare that I exceed 300 K worth of files in a single week. Sometimes my work involves doing graphics with GEM Draw or using a spreadsheet which can result in a larger space requirement — then I simply switch to a floppy with a higher capacity. I could also use a second floppy with XCOPY, but I prefer to keep everything on a single disk for that week. As you can see, I use the XCOPY command to create a "running" incremental backup of all files that have changed in the partition during a week.

Perhaps the most important point about the backup process is that it should always be done at the end of the work day or when a major update to a file or

files is performed (e.g., a large data base). Most of my own hard drive failures have occurred when I powered on the system at the BEGINNING of the day, and I was unable to boot or access the hard drive at all, no matter what I did. Fortunately, I have always the latest backup from the prior evening, as well as a complete backup, so it is an easy matter to restore files.

To restore files after a hard disk failure, all I have to do is use the last complete backup tape to copy the files to a new hard drive. The second step in the restore is obviously to copy the files from my incremental backup on a floppy disk (using XCOPY as usual) to the hard drive. At this point, all files are restored to their very latest version, assuming that you have faithfully followed this procedure.

If you use your computer for business as I do, it is especially important to keep a backup for data on a hard drive. Small businesses generally cannot afford the time and expense required to recreate a lot of data, such as a data base, and that does not even include the time and expense of replacing the hard drive when it fails. Even if you only use a system as a hobby, consider what might happen if you suddenly could not access some of your data files. Nearly everyone who has a personal computer has some "critical" files on it that would be difficult and time consuming to recreate. Lest you think that you need not perform regular backups if you only have floppy drives in your system, let me assure you that floppy disks fail too, not to mention any mistakes you might make. Since I have talked mostly about how to back up hard drives up to now, I will spend a minute looking at floppy disk backups for a change.

Backing Up Floppy Disks

Virtually all popular application software manuals discuss how to make a backup of the distribution disks supplied with the package. Most of the manuals I've seen suggest using the DISKCOPY command which is a good choice for that purpose. All you have to do is type something like `DISKCOPY A: B:`, insert the appropriate source disk in drive A, the target disk in drive B, and press RETURN. There is one caution in using DISKCOPY that you should know about, especially if you want to use it to back up your data files.

The DISKCOPY command creates an exact disk duplicate which is a true image copy of the source disk as I mentioned earlier. If the source disk is not perfect (e.g., it has some bad sectors), DISKCOPY will faithfully duplicate the marked imperfections on the target disk. An IMAGE COPY really is defined as an EXACT duplicate of the source, including any imperfections. One real advantage in using DISKCOPY is that it will also FORMAT the target disk, as well as "copy" files to it —

that can save time if you are using brand new floppy disks as the destination for the copied disk. Another advantage is that DISKCOPY will copy ALL files to the destination disk. That includes some files that cannot be copied using the normal COPY command, such as a LABEL, the BIOS (IBMBIO.COM), and the System Kernel (IBMDOS.COM).

Although DISKCOPY has some real advantages for copying program distribution disks, I usually recommend using the COPY or XCOPY command to make backups of data files. In many cases, the COPY command is faster because you can specify a single file name or multiple file names using wildcards. The COPY command is also part of the operating system (i.e., an internal or built-in command), so it is available any time you want to use it. Both DISKCOPY and XCOPY are external files that require the appropriate system disk, so they are a little more awkward to use in a floppy disk system because you usually have to change disks. Now back to backing up a hard disk.

Backup Software

One way to create hard disk backups is with the BACKUP command supplied with DOS. I have not really trusted the BACKUP command since version 3.10 when there were a lot of bug reports that the program would not reliably backup files in at least one situation, most often when a disk was changed (as requested by the prompt) in the "middle" of a file.

I have received a number of letters from users who use Fastback on their Heath and Zenith systems, and from most reports, virtually all of them are quite pleased with it. For those of you who have read my column for a while, you may recall that I have never recommended Fastback because early versions were copy protected, and my policy is not to review copy-protected programs. I said at the time I thought that was a particularly ridiculous application of copy protection, especially for a utility program that was supposed to help you protect data. If you need good backup software, I have a number of letters recommending the program, and although I have never used it myself, I do suggest it as one alternative because of the number of positive comments I've received about it.

In the past few years, I have recommended another backup program (DS-BACKUP from Design Software) because I thought it was a better value. And although that program is still a good value, I have recently received a copy of the Mace Gold Utilities that now includes backup and restore programs. I have recommended Mace Utilities in my column for several years, and this latest version continues to be highly recommended.

Mace Utilities, in general, especially

the latest Mace Gold release, are so good that the package deserves more than a passing mention. Unlike the perhaps better-known Norton Utilities and the more flashy PC Tools which includes everything but the kitchen sink, Mace concentrates on one thing — data recovery — and virtually all programs in the package are dedicated to that objective. Words that come to mind to describe Mace Utilities include something I learned during my Boy Scout days: Trustworthy, loyal, helpful, friendly, etc. Safe, reliable, and dependable are also words that are easily associated with this software that includes a program to recover accidentally deleted files, reorganize (i.e., "optimize") a hard disk, and backup and restore files to a hard drive. Mace Gold also includes a new program, called POP or Power-Out Protector, that saves a copy of your computer's memory at regular intervals (which you can change from 1 to 60 minutes). If the electric power in your area is as prone to interruptions as mine is, this single program can save you hundreds of dollars because you will probably not need an Uninterruptible Power Supply. And, of course, this package includes the backup and restore programs that caused this digression in the first place. The other utility software that I mentioned is also good, but I look for software that simply gets the job done. Mace does that and does it well.

I have mentioned some tricks with XCOPY, so it's time to take a more detailed look at how you use it.

Using XCOPY

Before getting too involved with the details, I should mention that I have heard a couple of unconfirmed reports that the XCOPY program may not be reliable when copying large numbers of files in some DOS versions. I have been using the program supplied with Zenith MS-DOS version 3.3 Plus on my Z-386 and SuperSport for some time, and I have not found any problems with it. I still am using version 3.21 on my Z-248 and have found no problems with XCOPY in that version either. Although I am hesitant to mention unconfirmed reports about problems, this particular report could obviously affect the integrity of a backup as I am discussing it, and I would suggest that you carefully check any backups if you use XCOPY to back up a large number of files. Since I normally use XCOPY to back up only a few files at a time, usually 10 or less, I may not have stress-tested the program to the point where it has a problem, even though I have successfully test-copied several hundred files with no problem. In any case, I still use XCOPY to make incremental backups, and it is easy to keep track of the files because there aren't very many changes on a daily basis.

As I mentioned earlier, this incremental backup technique relies on the Ar-

chive Bit being reset when you create a full backup. To be sure about the archive bit, you should run the "ATTRIB -A *.*" command in each of your subdirectories to reset (i.e., remove) the Archive Bit on all files. You can check each subdirectory to see if the Archive Bit is set on any file by using the "ATTRIB *.*" command which displays an "A" to the left of the file name when the Archive Bit is set.

Change to one of your subdirectories (any one) and COPY a small file to a file name like TESTCOPY.XYZ. Since this is a "new" file, it will be created with the Archive Bit set, and you can check it with the "ATTRIB *.*" command if you wish. Now, change to the root directory, insert a backup floppy disk in drive A, and enter the command: XCOPY *.* A:/S/M. If you followed this test procedure exactly, you will find that the test file (e.g., TESTCOPY.XYZ) was the only file copied to drive A. Change to the subdirectory where that test file is located, and run the "ATTRIB *.*" command again. You will find that the file does NOT have an "A" associated with it because it was reset with XCOPY.

The only purpose of this test was to illustrate how you can use the XCOPY and ATTRIB commands to create a backup based on the Archive Bit. You may also want to try this test by copying files in several different subdirectories to see that multiple files can be copied, regardless of where they are located within the directory structure.

If you tried this test, you probably noticed that the test file was created with the same directory structure as you have on your hard disk. I have found this is a distinct advantage because you always know exactly where the file came from. If you try this idea with two hard drive partitions, you should keep two backup floppies — one for drive C and one for drive D to keep things simple.

Another distinct advantage of this approach is that you can quickly and easily "restore" a file to your hard drive with either the COPY or XCOPY command. I have also found that files I back up with XCOPY are "active" files that I have been working on, and I rarely need to resort to firing up the complete backup to restore a file.

To summarize how you can use the XCOPY command as I have suggested, I have shown the command syntax as Figure 1.

```
XCOPY [d:][\path]source-file [d:][\path]dest-file [/S/M]
```

Figure 1
XCOPY Command Syntax for Backups

To be sure that XCOPY scans all files for the Archive Bit on the source drive, be sure that you run the command from the root directory. The /S (Subdirectory)

switch tells XCOPY to copy all files from the current parent directory (beginning at the root for the example) and look at all child subdirectories associated with that parent directory. The /M (Modified files) switch will cause XCOPY to copy modified files (i.e., those with the Archive Bit set), and the Archive Bit will be reset when the file is copied. Other switches can also be used with XCOPY, and you should refer to your Zenith MS-DOS manual for other switch values. This command is available in all DOS versions 3.2 and later.

There are some additional things you need to know about XCOPY if you plan to use it to back up files. First, XCOPY cannot copy a single file that is bigger than the capacity of the destination disk. For example, you cannot copy a 400 K file to a 360 K disk. Also, XCOPY does not and cannot "split" a file between two disks like backup software can.

Although you can use XCOPY to perform a complete backup, I don't recommend doing it because there is no "file compression" capability, and it would take a LOT of floppy disks. Still, you can use this technique to create a multiple-disk backup, and I have used it on the rare occasions when my active files exceed the capacity of a single floppy. All you need to do is replace the backup floppy and keep entering the "XCOPY *.* A:/S/M" command until the "Insufficient disk space" message no longer appears. As an interesting side note, both the Zenith MS-DOS and IBM PC-DOS manuals state that you will see a "Disk full" message when the destination disk is full. Not true. I haven't seen a "Disk full" error message for a long time, and it was apparently replaced by the "Insufficient disk space" message.

I have found that using XCOPY to create an incremental backup is an effective way to ensure that I don't lose any data files. I hope you will too.

MS-DOS Versus PC-DOS Versions

In the last few months, I have noticed there seems to be some confusion on the differences in MS-DOS and PC-DOS versions. For example, is MS-DOS version 3.2 the same as IBM version 3.20? For the most part, yes. And the Zenith MS-DOS version 3.21 is quite similar to PC-DOS 3.30. What is the exact relationship between Zenith's MS-DOS 3.3 Plus and the corresponding IBM version? In fact, what IS the corresponding IBM PC-DOS ver-

lease number" ahead of the usual version number assigned by other vendors. The latest Zenith MS-DOS 3.3 Plus, for example, is approximately technically equivalent to IBM's version 4.0. I use the words "approximately equivalent" because the Zenith version does not have the bugs relating to the large partition capability (512 MB) that its corresponding IBM version had, even though IBM has apparently fixed the bugs in its "new" version 4.01 or some such release. Even though Zenith 3.3 Plus does not include the so-called "graphics interface" that PC-DOS version 4.0 has, this graphics interface is virtually identical to the MS-DOS Manager that was jointly developed by Zenith and Microsoft a few years ago. The MS-DOS Manager was included as standard software with Zenith's eaZy PC, but both have been discontinued by Zenith, apparently due to lack of interest and sales. Although the MS-DOS Manager was quite similar to Windows in appearance, it did not have all of the Windows' capabilities which led to some criticism. And most users seem to find that this graphics interface is not particularly helpful because there are much better programs available.

From a user perspective, it is necessary to know that Zenith's MS-DOS version 3.3 Plus is essentially equivalent in all important respects to IBM version 4.0. Why is that important? Well, primarily because you may find some software says that you must have something like IBM DOS 4.0 or equivalent, so you need to know that Zenith 3.3 Plus is the equivalent. For example, 3.3 Plus supports the version 4.0 EMS (Expanded Memory Specification) driver which may be important for software that can use expanded memory. And the manual states that the expanded memory driver (EMM.SYS) included with 3.3 Plus also supports applications which use EMS version 3.2 without any changes. Because there always seems to be some confusion about expanded memory whenever I mention it, I want to note that the Zenith EMM.SYS driver ONLY works with Zenith memory boards, and it does NOT work with memory boards from any other manufacturer. If your system contains an expanded memory board that is not made by Zenith, you will have to contact the manufacturer of that board to find out about the availability of an updated EMS driver for that board.

Powering Down

I am receiving an increasing number of letters from many of you who are having problems getting service from a few of the Heath/Zenith Computer Centers. I will mention some of the comments I have received, in a future issue, (without your names) with some suggestions on helping correct this situation.

Continued on Page 48

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Continued from Page 32

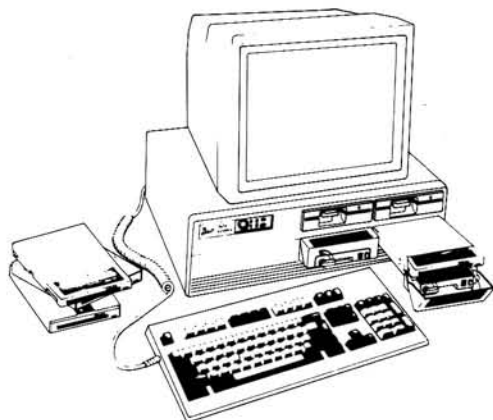
7. Unnecessary "pen-up move" commands were eliminated. This makes the most difference when using hard copy plotters.
8. Changed the maximum altitude from 23,000 nautical miles to 500,000 nautical miles.
9. Program source code was converted from MS-Pascal and Flexi-Graph graphics to Turbo Pascal and the Borland Graphics Interface (BGI). This was done to make it easier for others to modify the program and to support more graphics adapters. Supported video adapters include CGA, EGA, VGA, HERC, AT&T400, PC3270, and IBM-8514.

The distribution disk contains the PLOTMWDB and INDEXWDB programs. It also provides the index and data files for level 4 data. When plotting small areas of the earth higher levels of detail are frequently desired to get more realistic looking images. Level 1, level 2 and level 3 data provide 13.7, 8.3 and 2 times more detail than level 4. If this additional detail is desired, the full five disk set (\$10.00) is available from the address provided below. These disks have also been put in the public domain. The INDEXWDB program is used to index the data on the Micro World Data Bank II disks. Program source code and supporting documentation and

Continued on Page 40

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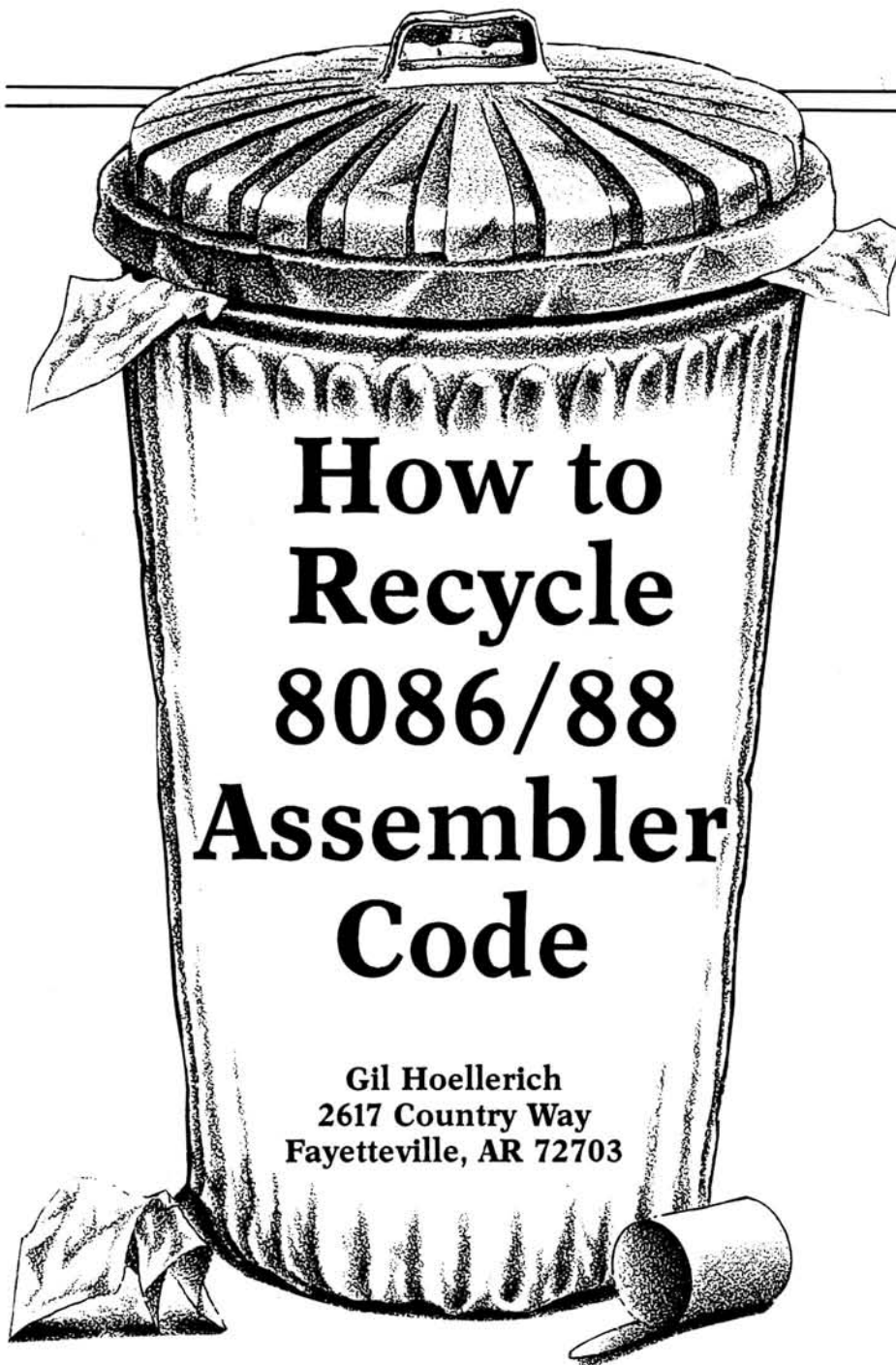
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Recently, the word recycle has been closely associated with the disposal of garbage. However, a trip to a dictionary revealed that one definition of recycle was to use again! So, if there is a group of lines of code that will be used several times in a program, we could call that recycling code.

While programming in BASIC, I had learned two techniques to recycle code. One was the use of subroutines with the command GOSUB and the other was the ability to use an external program with the command CHAIN. GOSUB uses a group of lines of code that is within the same program, while CHAIN uses a group of lines which are in a different program. CHAIN can also be used to return to the original program when finished.

So, naturally, when I started my tran-

sition to 8086/88 assembly language earlier this year, I was looking for the equivalent techniques. I found the information that I needed in several different sources, so I spent some time learning how to apply the techniques. Perhaps some of the readers who are interested in learning the use of the 86/88 language may find my experience helpful.

The use of the procedure, the equivalent of subroutines in BASIC, was reasonably well documented in the Volume II Reference Manual of MS-DOS Version 3 of the Programmer's Utility Pack (PUP) provided by Heath/Zenith, as well as several other books which I had.

So one could use the same code at different places in the program by establishing a procedure; the procedure would be started by the directive

```
procedure_name PROC NEAR  
followed by the code you wished to use  
with the opcode RET as the last and then  
terminate the procedure with the direc-  
tive
```

```
procedure_name ENDP
```

While procedures may be placed in a number of different places in the code, there is a definite precaution. Make sure that the usual execution of the code doesn't go through the procedure!! I use the practice to place the procedures immediately after the last executable instruction. For example, JMP BEGIN, INT 20, etc. However, be sure that the procedures are within the code segment, that is before

```
segment_name ENDS.
```

In BASIC, the command GOSUB line # or label will cause the execution to go to the first line of the subroutine. When it reaches the command RETURN, it will return to a position immediately beyond the GOSUB command.

In assembler, the command to go to the procedure is

```
CALL procedure_name;
```

the opcode RET is used to return execution to the command immediately beyond the CALL.

One disadvantage to subroutines and procedures within a program is that the code must be placed in the current program each time either by keystroking or by using word processing import type of commands. In BASIC, this disadvantage can be overcome by the CHAIN command, which allows the use of the same code with many different programs without entering the instructions in the current program.

My first clue that assembler had an equivalent technique to CHAIN was in the description of the linker in the user's guide in Vol. II of the PUP documentation mentioned earlier. The documentation contains the statement "Type the name or names of the object files you wish to link. If you have more than one name, make sure you separate them with spaces or plus signs (+)."

Next, I discovered Leo J. Scanlon's Assembly Language subroutines for MS DOS computers. That book was more specific about linking two .obj files with the illustration of

```
link callprog+fillmemb
```

where fillmemb was the name given by Scanlon to one of the subroutines in the book.

With this background and encouragement, I was able to design two short programs which could be linked into one run file. Since there were only a few lines of code, I decided to use the .COM type of file rather than .EXE file.

For the calling program, which is callprog in Scanlon's link command, I used the calling.asm file shown in Listing

Listing 1 CALLING.ASM file

```
extrn  fillmemb:near  ;extrn informs the assembler that
extrn  cr_lf:near     ; these two procedures are not in
                        ; this .asm file - near indicates
                        ; both procedures will be in the
                        ; same memory segment with the other
                        ; code.

gils    segment para   public  'code'
        org    100h
        assume  cs:gils
entry:  jmp     start
htable db    20 dup(?)  ;this reserves memory space for
                        ;inserted bytes

msg1    db      'I have finished.$'
start:
        mov     di,offset htable
        mov     al,'g'  ;technique for passing parameters to
        mov     cx,20   ; the external procedures. In this case
                        ; the character to be stored and number
                        ; of characters are passed in al and cx.

        call    fillmemb
        call    cr_lf   ;this call displays cr lf on screen
        mov     dx,offset htable ;prepares to display as a string
        mov     ah,9    ; the 19 g s placed in memory by
        int     21h     ; the external procedure fillmemb.
        call    cr_lf
        mov     dx,offset msg1
        mov     ah,9
        int     21h
        mov     ax,4c00h
        int     21h
gils    ends
        end      entry
```

Listing 2 CALLED.ASM file

```
gils    public  fillmemb,cr_lf
        segment para   public  'code'
        assume  cs:gils

fillmemb    proc    near

        push     di
        push     cx
        sub      cx,1
        cld
rep         stosb    ;this will store char in al at
                    ; memory address in di for the
                    ; number stored in cx

        mov     al,'$'
        stosb    ;this stores $ as end of string mark
        pop     cx
        pop     di
        ret
fillmemb    endp
cr_lf       proc    near
        mov     dl,0ah
        mov     ah,2h
        int     21h
        mov     dl,0dh
        int     21h
        ret
cr_lf       endp
gils    ends
        end
```

1. This is similar to the code shown on page 56 of Scanlon, but has some important differences: memory is filled with the character 'g' terminated by a \$ to allow a display on the screen; modifications necessary for a .COM file; the display of a message on the screen after the return from the external procedures.

For the called program, which is fillmemb in Scanlon's link command, I used the called.asm file shown in Listing 2. This code contains two external procedures: fillmemb and cr_lf. Notice that the file name (called.asm, in this case) does not need to be the same as either procedure_name! The called.asm file name is

used only in the linking operation and no reference appears in the linked program!

Notice that

gils segment para public 'code' is the same in both .asm files. The PUP documentation states "The optional class defines which segments are to be loaded in contiguous memory." This apparently does not mean that the two groups of code (calling and called) will be linked into one segment if both contain the class option of 'code' in the segments; I found that the segment_names of the two must be the same. Hence, I chose gils as the segment_name.

Notice now that the file name, segment name and procedure_names are different: the file name is called.asm; the segment name is gils; and the procedure_names are fillmemb and cr_lf.

The two .asm files were assembled separately. This created calling.obj and called.obj; these two .obj files were then linked by the command

link calling.obj+called.obj
which created calling.exe which was then converted to call.com by using the exe2bin program.

So now subroutines, such as those in Scanlon's book and other books, can be stored as .obj files on a disk. When any of these are needed, a

CALL procedure_name
command can be placed in the calling .asm file and then the appropriate .obj file can be linked. *

Continued from Page 38

analysis files for PLOTMWDB and INDEX-WDB are available separately from the author. These source code and associated files are not public domain.

The PLOTMWDB and Micro World Data Bank II disks may be obtained from:

Fred Pospeschil
3108 Jackson Street
Bellevue, NE 68005

The PLOTMWDB disk is \$5.00 and the set of five Micro World Data Bank II disks is \$10.00. The programs and data files on these disks may be freely copied, placed in club libraries, etc. but not resold without the permission of the author. Non-profit clubs may charge their normal, if any, duplication fee. *

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A DIFFERENT APPROACH TO DESKTOP PUBLISHING

A REVIEW OF FONTASY 3

PAT SWAYNE
HUG SOFTWARE ENGINEER



I guess you could say that in REMark Magazine, we have published our fair share of articles on desktop publishing. We (the REMark staff) are interested in desktop publishing programs ourselves, because we like to compare the output of these programs and their ease of operation with the system we use to prepare REMark. We use an Itel typesetter that has a dot resolution quite a bit higher than the best laser printers currently available, and a fairly nice WYSIWYG (What You See Is What You Get) software package to operate it from a Z-248 computer. This system produces the professional quality results that you see here in REMark, but it is quite a bit more expensive than a laser printer and desktop publishing software. It is also a photographic system, which means that a developing process involving smelly chemicals is required to produce the final result. So we always keep an eye on what the desktop publishing industry is doing. Someday they are bound to come up with something cheaper and better than what we have.

I personally am also interested in the low end of desktop publishing, because I like to see what can be done on an inexpensive dot matrix printer. So far, the best

low end (inexpensive) desktop publishing program that I have seen is NewsMaster II, which I reviewed in the December 1988 issue of REMark. I have also examined Fontasy and PFS: First Publisher, other good low end publishing programs. First Publisher has become quite popular because it works more like the high end desktop publishing programs and provides pretty good support for the high end (laser) printers. So it can be used as a bridge from low end to high end desktop publishing.

Low End and High End

At this point, I should explain a fundamental difference between the low end and high end desktop publishing programs. The high end programs are designed specifically to work with laser and other high density printers. They make use of built-in or add-on fonts to produce text characters on a page. When they display a WYSIWYG picture of your page on the computer screen, they are actually displaying an approximation of what the printer will produce using its fonts. The low end desktop publishing program, however, is designed to work with simple printers that do not have a lot of built-in

fonts. So it operates the printer in a graphics mode, and paints the characters on the page pixel by pixel. When it displays the page on the screen, it can use the actual graphic characters that are used on the printer, so that the screen image can be an exact duplicate of what will be printed.

When a low end publishing program is used with a high density printer, such as a 180 X 180 dots-per-inch "letter quality" dot matrix printer, or a laser printer, a program like NewsMaster II or PFS: First Publisher will still print characters using the dot resolution of an inexpensive printer (typically 72 by 120 dots per inch), and use a "smoothing" technique to fill in the "steps" caused by the low resolution. When I mentioned previously that First Publisher provided some support for laser printers, what I meant was that it can use at least some of the fonts available for laser printers, which look a lot better than course resolution characters that have been smoothed.

How Fontasy Prints

Fontasy works like NewsMaster II and First Publisher in that it uses the graphics mode of the printer to paint the

characters pixel by pixel. Unlike the others, however, when you use it on a higher resolution printer, it does not print the characters at the low resolution and then attempt to smooth them. Instead, it paints the characters using the same pixels. What this means is that if you have a character that is one inch tall and one inch wide when it is printed on a 72 by 120 dots-per-inch low resolution printer, it will be 2/5 of an inch tall and 2/3 of an inch wide if it is printed on a 180 × 180 dots-per-inch printer. The characters are not only printed smaller on a higher resolution printer, but the aspect ratio of them is altered. Fortunately, Fantasy has the ability to fix the aspect ratio. It can also enlarge the characters, and even apply smoothing to fix up the jaggedness caused by enlargement. But ProSoft, the company that produces Fantasy, also provides a very large selection of fonts that are available on separate disks. Some of these are designed for use on low resolution printers, and some for use on high resolution printers. So Fantasy is capable of producing text on a laser printer that is every bit as good looking as that produced by a high end desktop publishing program. The font disks, of course, cost extra, but they are cheaper than font cartridges or "soft fonts" designed for use with laser printers, and the selection of different fonts is probably unmatched anywhere.

Actually, if you have a Hewlett-Packard compatible laser printer, you can use Fantasy fonts without Fantasy. ProSoft sells a program that can convert Fantasy fonts into Hewlett-Packard downloadable fonts. So if you are looking at soft fonts for your HP laser printer, you might want to check out ProSoft fonts.

Memory Hungry

Fantasy not only prints fonts pixel by pixel and displays them that way, but it also stores the page you are working on in memory in pixel format. You can figure out how much memory will be used for a page using this formula:

$$\text{memory used} = \text{vertical resolution} * \text{vertical size} * \text{horizontal resolution} * \text{horiz. size} / 8 \text{ (bits per byte)}$$

Using this formula, you can see that an 8 × 10 inch page will use 86,400 bytes if you have a low resolution (72 × 120) printer. If you have a "letter quality" printer, the page will use 324,000 bytes, and if you have a 300 × 300 laser printer, it will take 900,000 bytes! Obviously, you will not be able to compose even one full page for a laser printer in a standard MS-DOS system limited to 640k (655,360) bytes of memory. That was one of the main problems with the original version of Fantasy. You could only compose small "mini pages" for high resolution printers. This was true for both letter quality and laser printers, because Fantasy actually

needs twice the memory required by a page. The extra memory is used for block operations, an "undo" feature, and other purposes.

The new version, Fantasy 3, overcomes this problem with the ability to use EMS memory (also called LIM or Expanded memory). It can use up to 3 megabytes of EMS memory, giving you plenty of room to compose full pages for laser printers. Your computer must, of course, have the EMS memory installed before Fantasy can use it.

One problem I encountered with Fantasy 3 is that if you have less than 1 megabyte of EMS memory, you will have to disable it (rename your EMS driver or something) before you can run Fantasy. Otherwise, it will indicate an EMS error and refuse to run, even if you configure it to not use EMS memory.

The Screen Display and Artwork

The fact that Fantasy displays characters on the screen using the same number of pixels that will be used in printing them causes an additional problem when high resolution printers are used. The highest screen resolutions that Fantasy 3 supports are EGA (640 × 350) and Hercules (720 × 348). So if you are preparing a page for a laser printer, the screen view represents not much more than a 2-inch by 1-inch window on the page. You can switch to a full page view that shows an approximation of how the printed page would look, but there are no intermediate views between the small window and the full page view. So preparing a page for a laser printer using Fantasy by itself would be quite difficult. Fortunately, Fantasy can import text files (plain ASCII) and it has a number of "dot" commands that can be inserted into a file to control such things as justification or centering, font selection, and template loading. About the only jobs you should have to do using the Fantasy screen are preparing templates and inserting clip art.

One of the minuses with Fantasy is that it only comes with a sample of available fonts and clip art. You will almost certainly have to buy at least one font disk to even prepare simple newsletters. The completeness of the basic package is one of the factors I use in rating which low end publishing package is the best. NewsMaster II comes with a good selection of both fonts and clip art, and it is ready to use "out of the box". First Publisher comes with a good selection of fonts, but only a sample selection of clip art. However, it does have a drawing editor and the ability to import graphic files from other sources.

Fantasy comes with a good drawing editor (better than the First Publisher drawing editor), and it also has the ability to import graphic files in GW-BASIC BSAVE format. It can import CGA, EGA, or

Hercules format pictures, providing that it is operating in the same format as the picture you are trying to import. If you run it on an EGA system, you can bring it up in the CGA mode using an optional command line switch, so that you can import either CGA or EGA pictures on an EGA system. With a good drawing editor and the ability to import pictures, you may not need to buy a clip art disk to make good use of Fantasy. ProSoft also provides a utility disk (at extra cost) that can convert scanner and digitizer files to Fantasy format. In fact, the clip art sold by ProSoft was made by scanning actual drawings on paper.

Kerning and Character Manipulation

One unique feature of Fantasy that deserves mentioning is that it supports kerning. Kerning means that letters can be spaced more closely by tucking letters into recesses of other letters where they will fit. For example, if you write "To", the letter o will be tucked under the arm of the letter T. To illustrate, here is how NewsMaster prints the word "aware" in all capitals in a 24 point Roman style font.

AWARE

Here is how Fantasy prints aware in one of its sample fonts, called "Roman3". This font prints at about 22 points on a low resolution (9 pin) printer.

AWARE

Notice that the letter A's on either side of the W are closer to the W in the Fantasy sample.

In addition to kerning, Fantasy has the ability to "float" individual characters. With this ability, you can make wavy lines of text or do other special effects. You can also rotate blocks of text, or make mirror images of text. In its ability to manipulate text, Fantasy is probably the most versatile of the low end publishing programs.

Recommendations

If you have a laser printer and you want to do desktop publishing with it, you would probably be better off getting one of the high end publishing programs, such as Pagemaker or Ventura Publishing, rather than trying to use Fantasy to do the job. If you have an inexpensive 9-pin dot matrix printer and you want to produce a not-too-fancy newsletter with it, then I would recommend NewsMaster II. But if you have a 24-pin "letter quality" printer, and you want to get printed output from it that looks as much as possible like it came from a laser printer, then Fantasy 3 is the way to go. The only drawback is that you will need a megabyte of EMS memory, or be satisfied with smaller than normal pages.



GETTING STARTED WITH . . .

GENERIC CADD

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MADISON, WI 53704

If you use your computer to draw, or would like to, cadd (computer-aided drawing and design) can help you do it. This article will introduce you to Generic CADD, a cadd program for Zenith and other IBM-compatible computers.

The introduction will be "hands-on," as we use Generic CADD to make a sample drawing of a bedroom floor plan. Along the way you'll get a feel for how you can use the program to begin drawing whatever it is you need to draw. Even if you're not at all familiar with cadd, you'll get some ideas of what cadd can do and whether or not it's for you.

Where is cadd used? Its most obvious application is for making scale drawings. This includes all kinds of traditional drafting tasks, such as architectural blueprints, drawings of mechanical devices, or any drawing where the lines on paper (or on screen) are in proportion to the actual dimensions of what's being drawn.

Because of the way cadd defines objects in a drawing — by their true, geometric definitions rather than by their on-screen dimensions — cadd drawings can be made with great accuracy and precision.

Cadd is also useful if you use the same shapes or symbols repeatedly in your drawings. Any drawing that you might do on paper with the aid of a template is a candidate for cadd. Many cadd programs let you buy or make libraries of often-used symbols, so you can place a symbol in a drawing without drawing it line-by-line each time.

Purely artistic drawings can certainly be done with cadd, as well, especially if proportion, precision, and/or repetition play an important part in the design.

About Generic CADD

Generic CADD is actually three programs, or levels, each with different capabilities. In preparing this article, I used Level 3, version 1.05. Level 3 is the most full-featured one, but for the most part the commands and features mentioned are basic ones common to all three levels.

Level 3 version 1.05 requires an IBM-PC, /XT, or /AT compatible computer with 512K of RAM, two floppy drives or one floppy and one hard drive, a video graphics board, and DOS version 2.0 or higher. A mouse is recommended, though it is possible to use the keyboard (the arrow, ENTER, and HOME keys) instead. A coprocessor chip will speed up the drawing process, but isn't required. Drawings can be plotted with a dot-matrix (or laser) printer and the separate DOTPLOT program. (Pen plotter support is also included.)

(Note: this article assumes you're working with version 1.05 of Generic CADD Level 3. In version 1.1, DOTPLOT was combined with the main drawing program. I haven't tried version 1.1, but there should be just two main differences for the purpose of this introduction — with version 1.1, you select your printer in the CONFIG program, instead of in DOTPLOT (which is no longer needed), and you can plot from the main drawing program instead of having to quit and run DOTPLOT.)

I run Generic CADD on a Zenith 158 with a hard disk, Hercules-compatible monochrome graphics, a Logitech serial mouse, and Panasonic 1091 dot-matrix printer. The list price for Generic CADD Level 3 (v.1.1) is \$299.95, but it's often available for less from third-party vendors.

For this article, I'll assume you have a basic familiarity with the MS-DOS operating system, including how to use disk directories and run programs, and that your system includes a mouse. Procedures described that require disk access may vary slightly if you're using floppies instead of a hard disk.

Starting Up

Before you run the main cadd program for the first time, you need to configure it for your system. To do this, you'll need to know what type of graphics display you have (CGA, EGA, Hercules, etc.), and whether or not your regular mouse driver will normally be in memory when you run Generic CADD. If you use your mouse regularly, the mouse driver is probably loaded by your AUTOEXEC.BAT or CONFIG.SYS file each time you power up. If you're not sure, check your mouse's documentation for help.

The first step in running Generic CADD, as with most programs, is to copy the appropriate files onto a "working" floppy or hard disk. An installation program on Generic CADD's program disk guides you through this process.

To begin the installation, insert your Generic CADD program disk into drive A and at the A: prompt, type
GO

Press RETURN and follow the on-screen instructions for copying your files. Partway through the process, the program will run the configuration program, CONFIG. You'll see a screen displaying the default system configuration, which will probably differ from yours.

Follow the instructions and press any key to continue to the main configuration menu. For now, you need to deal with only the first two menu items.

Enter 1 to call up a list of video-display types, and choose the one that most closely matches yours. In the same way, enter 2 for a list of pointing devices (keyboards, mice, and digitizers).

Generic recommends choosing one of the general-purpose mouse drivers: MOUSE.COM DRIVER — 2 BUTTON, or MOUSE.COM DRIVER — 3 BUTTON. For these to work, the regular mouse driver (the one that came with the mouse) must also be loaded into memory. If you're in doubt about what to do, select one of the general-purpose drivers.

If the program asks you to choose a mouse speed (from 1 to 16), choose a midrange value; you can change it later if you wish.

Another item you might want to take a look at in the main configuration menu is SET SCREEN RATIO. The height-to-width ratio of different video screens can vary slightly, causing a circle that's round on one screen to be oval on another.

The set-screen-ratio option lets you customize the display so your circles will always be round (and your squares, square). The instructions that appear when you select this option show what to do.

Another useful option, especially if you have a hard disk, is the ability to set up a custom default path for your drawing files. To do this, in the main menu, select OTHER OPTIONS, then SET DEFAULT PATH FOR FILES, and follow the instruc-

tions.

When you're finished configuring, select item 8 (EXIT TO DOS). You'll again see the current configuration screen, this time showing the options you've selected. Enter

Y
to save the configuration (or N to start over or quit without saving the changes).

A final question asks whether or not you want to reserve memory space for saving a screen image of your drawing. This is used when loading a drawing into other programs. You can answer no now and select this feature later if you need it. In fact, any of the choices you've made so far can be changed at any time by running CONFIG from DOS and making the appropriate selections.

To finish the installation, follow the on-screen instructions to copy the remaining files.

The disk containing the DOTPLOT plotting program has its own installation program. To run it, insert your DOTPLOT disk, type

GO
and press RETURN. Follow the on-screen instructions to copy the files to a "working" floppy or hard disk.

Creating a Drawing

You're now ready to run the main cadd program. From the disk and directory containing the program CADD.EXE, type

CADD
and press RETURN.

The first screen lists your configuration once again. Follow the on-screen instructions and press RETURN to continue.

You'll now see the message
ENTER A DRAWING FILE NAME >

Before you begin to draw, you have to name your drawing. To name it BEDROOM.DWG, enter
BEDROOM

The program adds the extension .DWG automatically. The screen will now show the message

DRAWING FILE NOT FOUND: BEDROOM.DWG
IS THIS A NEW DRAWING? (Y,N) >
Enter
Y

Most of the screen is now taken up by a large rectangle, empty except for a cursor in the shape of a "plus," or crosshairs. The rectangle is the drawing area, where you'll create your drawing. The crosshairs is the drawing cursor, which controls the placement of what you draw. To move the drawing cursor, roll your mouse.

If your cursor doesn't respond to mouse movement (is the mouse plugged in?), try pressing the ESC key a few times. If a command has been selected and the program is waiting for you to type a response, the cursor will "lock up" until you respond. Pressing ESC will cancel the

command and give you back control of the cursor.

If this fails, you may need to try a different mouse driver. Type QU to quit the program and return to DOS. From there, you can run CONFIG again, select a different driver, and begin again. (Anytime you want to quit the main cadd program, typing QU will do it.)

To the right of the drawing area on the drawing screen is the menu area, containing the root menu. Each item in the root menu is the name of a submenu, a list of Generic CADD commands and menus grouped by subject. As you roll your mouse toward or away from you, different items in the root menu are highlighted by another cursor, a bright box called the menu cursor.

The menus allow you to select just about all of Generic CADD's commands, so you don't have to remember them or look them up each time. (But you're not limited to using the menus. Commands can also be executed with two-letter codes entered at the keyboard. More on that later.)

Above the drawing area is the coordinate area, which shows the location of the drawing cursor. The X coordinate gives horizontal distance and the Y coordinate shows vertical distance, as on a graph. Initially, the bottom left corner is at 0,0. As you move the cursor, the coordinates display changes to match the cursor's current position. The default units are feet and inches.

At the bottom of the screen is the prompt area, with the message
ENTER A COMMAND >

and some information about your drawing and the options selected.

Line Drawing

Now let's draw some lines. Drawing is controlled by the drawing cursor and mouse button #1.

Press mouse button #1 (the leftmost button) to begin a line at the location of the drawing cursor. Don't worry about the exact locations for these practice lines. Move your mouse and a line will appear connecting the point you've selected and the drawing cursor. (If you don't see a line, type RB to turn on "rubber-banding.")

Press mouse button #1 again, and a line will be drawn on the screen between the two selected points, with a second line now stretching between the last point selected and the drawing cursor.

To end the line at the last point selected, press ESC. To start a new line, press mouse button #1 again and proceed as before.

Almost as important as knowing how to draw is knowing how to erase. We can find the erase commands by navigating through the menus. Menu items are selected with the menu cursor and mouse button #2 (the middle button on a 3-button mouse, the right-hand button on a 2-button mouse). Move your mouse so that the menu cursor highlights OBJECTS, and press mouse button #2.

The menu area should now display the objects menu, with the menu name on top, followed by a list of items. The final item is ROOT MENU. If you get the wrong menu by mistake, you can return

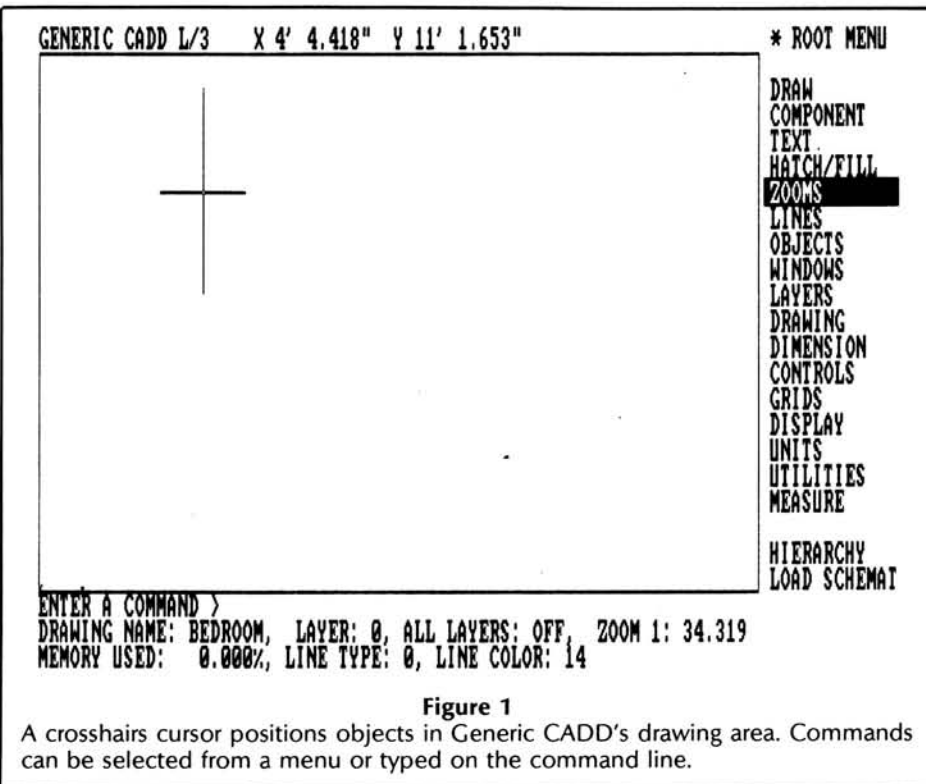


Figure 1

A crosshairs cursor positions objects in Generic CADD's drawing area. Commands can be selected from a menu or typed on the command line.

to where you started by highlighting ROOT MENU with the menu cursor and pressing mouse button #2.

Using the same technique, from the objects menu select

ERASE

As mentioned before, commands can also be selected by typing a two-letter code. For example, instead of selecting OBJECTS, then ERASE, you can type OE and the command will be executed immediately — you don't even have to press RETURN. The two-letter codes can be used at any time, no matter which menu is currently selected.

From now on, when giving a menu command, I'll also give the two-letter code in parentheses. This way you can use whichever method you prefer.

When you select OBJECT ERASE, the prompt area will say

ENTER A POINT ON THE OBJECT TO ERASE >

The program considers each line segment "clicks" to be an object. Use the mouse to move the drawing cursor to a point on or near a line segment, and press mouse button #1 to erase it.

If you erase an object by mistake, immediately select in the objects menu

UNERASE (UE)

to bring it back. You can use this command several times in succession — selecting UNERASE three times will restore the last three objects erased.

To erase the last line segment drawn, in the objects menu select

ERASE LAST (EL)

To erase all of the objects in an area at once, return to the root menu and select

WINDOWS

ERASE (WE)

At the message

PLACE WINDOW >

with mouse button #1, select a corner of the area to be erased. As you move your mouse, a box, or window, will appear on the screen with the selected point and the drawing cursor as opposite corners. If you want to reposition the starting corner of the window, press ESC to cancel the command and try again.

When the window surrounds the objects you want to erase, press mouse button #1 again. All objects that are entirely within the window will be erased.

After you erase, parts of lines that overlapped the erased lines may disappear from the screen, even though they're still part of the drawing. To bring back the "true" drawing, select from the root menu

DISPLAY

REDRAW (RD)

To erase all of your practice lines and start fresh, from the root menu select

DRAWING

ERASE (DX)

The prompt area will ask

!!!WARNING!!!

DO YOU REALLY WANT TO ERASE THE DRAWING

(Y,N)

We do, so answer

Y

Before we begin drawing our floor plan, here are some tips on how to recover from mistakes when selecting commands. The program uses two types of commands — toggle and non-toggle ones. When you select a toggle command (GRID ON/OFF, for example) the relevant option automatically changes to the opposite state (turns the feature on or off). In contrast, most non-toggle commands, such as OBJECT ERASE, will prompt you for additional information before executing.

If you select a command by mistake, or if you change your mind after selecting, check the prompt area for a message. If it's a toggle command, the prompt area will tell you the current state of the command (DISPLAY GRID IS ON, for example). In this case, you'll probably want to reselect the mistaken command to return it to the original state.

If you've selected a non-toggle command and the prompt area asks you for more information, you can press ESC to cancel the command. In any case, the prompt area keeps you informed about what the program is doing.

A Floor Plan

Now let's set the size of the drawing screen so the bedroom to be drawn will fit in it. From the root menu, select

CONTROLS

LIMITS (LS)

The prompt area asks

CHANGE HEIGHT LIMIT (24.000) IN >

To change the height of the drawing area from the default height (24 inches) to 15 feet, enter

15'

You must include the apostrophe to indicate feet, or else enter 180, to give the height in inches (the default units).

You'll then see the prompt

CHANGE WIDTH LIMIT (36.000) IN >

For a drawing area 20 feet wide, enter

20'

You've defined a drawing area with limits of 15' and 20'. In the menu area, select in order

ROOT MENU

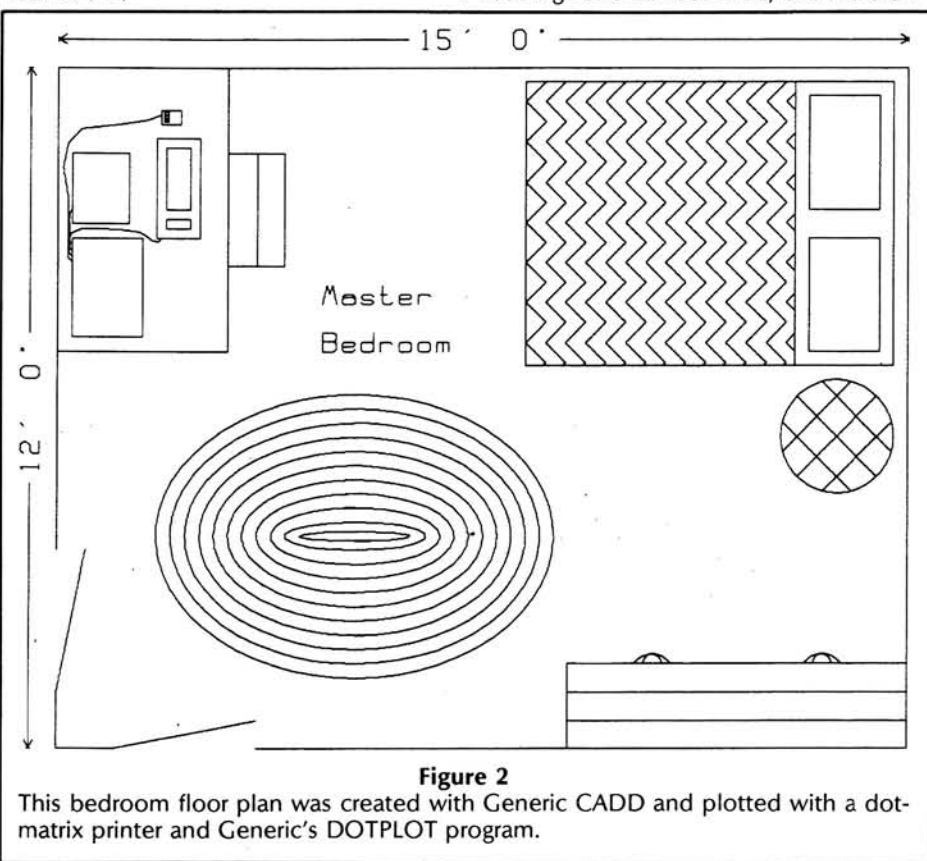
ZOOMS

LIMITS (ZL)

This returns you to the root menu, selects the ZOOMS menu, and zooms the drawing area to dimensions that fit the limits selected. You can verify the limits by watching the cursor coordinates as you move the drawing cursor. With the cursor in the lower left corner of the drawing area, the coordinates should be at 0,0. The top left should be at about 0,15, the bottom right, at around 20,0 and the top right, at about 20,15.

The coordinates may not match the limits requested exactly. If the drawing area's shape doesn't match the shape described by the limits, the drawing area expands to fit the limits requested as best it can.

Of course, the screen isn't really 15 feet high and 20 feet wide, but the draw-



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ing area is dimensioned as if it were. You can give the drawing area huge dimensions, or tiny ones, to match what you're drawing. You don't have to use scale factors (such as 1 in.=1 ft.) to convert measurements as you draw — the program does it for you.

The limits define the size for the ZOOM LIMITS command, but the drawing can extend beyond the limits, and you can change the limits whenever you want.

Now let's begin to draw our floor plan. (In keeping with the spirit of this article ("Getting Started with..."), our drawing will be a simple example of a scale drawing, with no pretense of being a "true" architectural drawing.)

To provide a frame of reference, a grid of dots can be superimposed on the drawing area. From the root menu, select

GRIDS

GRID SIZE (GS)

At the prompt

CHANGE GRID SIZE (1.000) IN >

enter

6

A grid of dots now covers the drawing area, with the space between two dots representing 6". As with most other parameters, the grid size can be changed whenever you want, to whatever size the task at hand calls for.

To help in placing the drawing cursor exactly on the grid points, from the GRIDS menu, select

SNAP GRID (SG)

This is a toggle command, and the prompt area will show the message

SNAP TO GRID IS ON

Now as you move your mouse, the drawing cursor will jump from grid point to grid point, instead of traveling smoothly around the screen. Each time you select SNAP GRID, the effect toggles on or off.

To help in drawing the bedroom to scale, we can change the coordinates display to show relative, or delta, coordinates. From the root menu, select

DISPLAY

DEL COORDS (DC)

Move the drawing cursor to a point near the bottom left corner of the screen and press mouse button #1. The coordinates display will change to 0,0. Now as you move the cursor, the coordinates display shows the distance between the last point selected and the current cursor position. (To switch back to absolute coordinates, select ABS COORDS (AC) in the display menu.)

For a bedroom 12' wide, draw a line from your selected point to 0,12' (using delta coordinates) and press mouse button #1. A line will be drawn between the two points and the coordinates display will once again return to 0,0. For a bedroom 15' long, continue drawing to 15,0, then to 0,-12', and finally to -15,0. Press ESC to finish.

To draw a partly open door 30" wide,

select a point on a wall of the bedroom and draw a line from it to 2'6",6". Draw a rectangle to represent a bed. Use the coordinates display to help you draw it to scale.

To draw a round table next to the bed, from the root menu select

DRAW

CIRCLE 2 (C2)

and follow the instructions in the prompt area.

To add detail, you can zoom in on a portion of the drawing. From the root menu, select

ZOOMS

WINDOW (ZW)

At the prompt

PLACE WINDOW

place a window as you did for the WINDOW ERASE command. The area you select will expand to fill the drawing area. To return to the full drawing, from the zooms menu, select

LIMITS (ZL)

If you have a color display, you can use different colors to draw. From the root menu, select

LINES

COLOR (LK)

and follow the instructions in the prompt area.

Layers and Text

Using layers lets you swap objects in and out of the drawing easily. Each layer is like a separate drawing on a transparent sheet that you can add or remove at will. To change your current drawing layer, from the root menu select

LAYERS

CURRENT (YC)

At the prompt

CHANGE CURRENT LAYER (0) LIMITS: 0 TO 2

55 >

enter

1

Whatever you draw will now be placed in layer 1, instead of layer 0 (the default layer). Both layers are visible, but you draw (and erase) on layer 1 only. The prompt area tells you which layer is the current one.

Add a rug or something else to the drawing. Then from the layers menu again select

CURRENT (YC)

and enter

0

This reselects layer 0 as the current drawing layer. Try to erase what you drew on layer 1, and it will stubbornly refuse to disappear. To erase on layer 1, it must be reselected as your current drawing layer.

To hide layer 1 temporarily, from the layers menu select

HIDE (YH)

enter

1

then select

REDRAW (RD)

The item you added on layer 1 will disappear. To bring it back, from the lay-

ers menu select

DISPLAY

and enter

256

to display all layers.

You can also add labels in your drawing. To specify the size of the letters, from the root menu select

TEXT

SIZE (TZ)

The size of the text characters, like everything else in the drawing, is given in terms of the specified dimensions of the drawing, rather than in terms of actual size on the screen. For instance, our drawing has a 6" grid, so 6" text characters will be as tall as the space between two grid points (rather than being 6" tall on the screen). For this drawing, 4" text characters sounds about right. At the prompt

CHANGE TEXT SIZE (1.000) IN >

enter

4

To label the drawing, from the text menu select

PLACE (TP)

At the prompt

LOAD FONT NOW ? (Y,N) >

answer

Y

to load the default font (character set) from disk into memory. The font needs to be loaded only once in the drawing session.

Follow the instructions in the prompt area and select a starting point with mouse button #1. Then type in your label

Master Bedroom

and press ESC when you're finished.

To place another label, again select

PLACE (TP)

(An alternate, quick way to repeat the last command executed is to press the SPACE bar on the keyboard.)

The commands shown so far are just a few of the over 200 commands available. Most are self-instructing, so you can learn by experimenting. Add more objects to the drawing, either with the commands used so far or some new ones.

Remember to watch the prompt area for information about what the program is doing. A few commands, such as CURVE (CV), require a PEN UP command to finish executing. Do this by typing PU.

One caution: DISPLAY MENU is a toggle command that will erase the on-screen menus. This can be disconcerting if selected by mistake. Type VM (not DM, as you might expect) to bring the menus back.

Plotting

When you have your drawing as you want it, you can plot it with a dot-matrix printer and DOTPLOT. To do this, you'll first need to save your drawing and exit from the main cadd program (unless you have version 1.1 — see note above).

You must save your drawing if you want to plot it, change it, or even view it

again after you quit the program.

Select from the root menu

UTILITIES

QUIT (QU)

At the prompt

SAVE CURRENT DRAWING (Y OR N) >

answer

Y

The prompt area shows the name and path the drawing will be saved in. If no path is shown, the drawing will be saved in the drive and directory you were in when you ran CADD. Enter a different name or path, or press RETURN to keep the original.

Follow the instructions and enter

Q

to quit Generic CADD and return to DOS.

To plot the drawing, from the drive and directory containing DOTPLOT, type DOTPLOT

and press RETURN.

The first screen in DOTPLOT lists the current configuration, which probably won't match your system's configuration the first time you run the program. Press RETURN to see the main DOTPLOT menu, and select

1

to configure DOTPLOT. The procedure is almost identical to the one used to configure the main cadd program. You need configure only items 1, 2, and 3. Select these in turn and follow the instructions to choose your video display, pointing device, and printer from the options given.

When selecting a printer, you may be asked to choose a resolution. Low resolution means a "cruder" drawing (fewer dots per inch), but faster plotting. For your first plot, select a low resolution; you can experiment with the others later.

When you're done configuring, select item 9 to review and accept your selections and return to the main menu (or to start over or quit without making any changes). You need to configure DOTPLOT only the first time you use it, or when you want to change something.

Before it's plotted, the drawing must be loaded into memory. From the main menu, select

3 LOAD A DRAWING

Enter the drawing file name, and path if necessary. For example, entering

BEDROOM

will cause DOTPLOT to look for a file called BEDROOM.DWG in the current drive and directory. If you see the message

DRAWING NOT FOUND

be sure you've given the correct path for the drawing. When the drawing has been loaded, select

7 PLOT THE DRAWING

You'll see a screen much like the main drawing screen, with your drawing displayed in the drawing area, a menu area on the right, and a prompt area along the bottom.

You can quit DOTPLOT at any time by typing QU, or by selecting MAIN MENU in the menu area and quitting from there. (If you're in the middle of a command, you may have to press ESC to get the mouse or keyboard to respond.)

To plot the drawing, at the prompts

CHANGE PAPER WIDTH (8.0 IN) >
and

CHANGE PAPER HEIGHT (10.0 IN) >

press RETURN to accept the default values given in the prompt area, or enter new values.

The exact values you give for paper size aren't critical, so long as they're no larger than your actual paper size. In general, dimensions half an inch or so less than your actual paper dimensions ensure that the drawing will fit on the page.

Next, the command line presents you with three options:

ENTER "V" TO PLOT CURRENT VIEW

ENTER "F" TO PLOT FULL DRAWING

ENTER "S" TO PLOT USER SCALE

Of the three, PLOT FULL DRAWING is the simplest. It expands or shrinks the entire drawing to fit the paper size specified and plots it at that scale. To plot with this option, enter

F

At the prompt

FAST REDRAW (Y,N) >

answer

N

to preview the actual drawing as it fits on the page. (Answer Y to see only the position of the drawing on the page.) If necessary, the drawing is rotated for the best fit.

At the prompt

PLOT THIS DRAWING ? (Y,N) >

Type

Y

and your printer will plot your drawing.

Once you've created a plot, you can experiment with the other plotting options or try a different printer resolution. To change resolution, return to the main DOTPLOT menu by selecting MAIN MENU with the menu cursor and selecting the configure option.

To quit DOTPLOT, type QU.

If you want to edit your drawing, run CADD as you did before. When it asks you for a drawing name, give the name and, if necessary, the path of the saved drawing.

When the drawing is loaded, you can make any changes you wish. If you want to keep the original, as well as the edited version, give the new version a different name when you save it.

Going Further

This completes our introduction to Generic CADD. As you get more familiar with the software, you can start to take advantage of some of its customizing features. You can create your own menus, assign commands to the function keys, create components, and write batch files to carry out sets of commands automatically.

These advanced features can make your drawing tasks more efficient. At the same time, the on-screen menus make it easy to do what you want, even when you're new to the program. So start drawing and see what cadd can do for you.

Generic CADD Level 3

\$299.95

Generic Software, Inc.

11911 North Creek Parkway South

Bothell, WA 98011

206-487-CADD

1-800-228-3601



Continued from Page 37

For help in solving specific computer problems, be sure to include the exact model number of your system (from the back of the unit), the ROM version you are using (use CTRL-ALT-INS to find it), the DOS version you are using (including both version and BIOS numbers from the VER command), and a list of ALL hardware add-ons (including brand and model number) installed in your computer. The list of hardware add-ons should specifically include memory capacity (either added to an existing board or on any add-on board), all other internal add-on boards (e.g., modems, bus mouse or video cards), the brand and model of the CRT monitor you have, and the brand and model of the printer, with the type of interface (i.e., serial or printer), you are using. Also be sure to include a listing of the contents of the AUTOEXEC.BAT and CONFIG.SYS files unless you have thoroughly checked them out for potential problems (e.g., TSR conflicts). If the problem involves any application software, be sure to include the name and version number of the program you are running when the problem appears.

If you have questions about anything in this column, or about Heath/Zenith systems in general, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion, comment or request.

Products Discussed

MS-DOS 3.3 Plus (OS-51-3)

List Price \$149.00

Mail Order w/Update Card Only 49.00

SupersPort 286 w/20 MB HD 4999.00

Heath/Zenith Computer Centers

Heath Company Parts Department

Hilltop Road

St. Joseph, MI 49085

(800) 253-7057

(Heath Catalog orders only)

Mace Gold Utilities

\$149.00

Paul Mace Software, Inc.

400 Williamson Way

Ashland, OR 97520

(800) 523-0258 (Orders only)



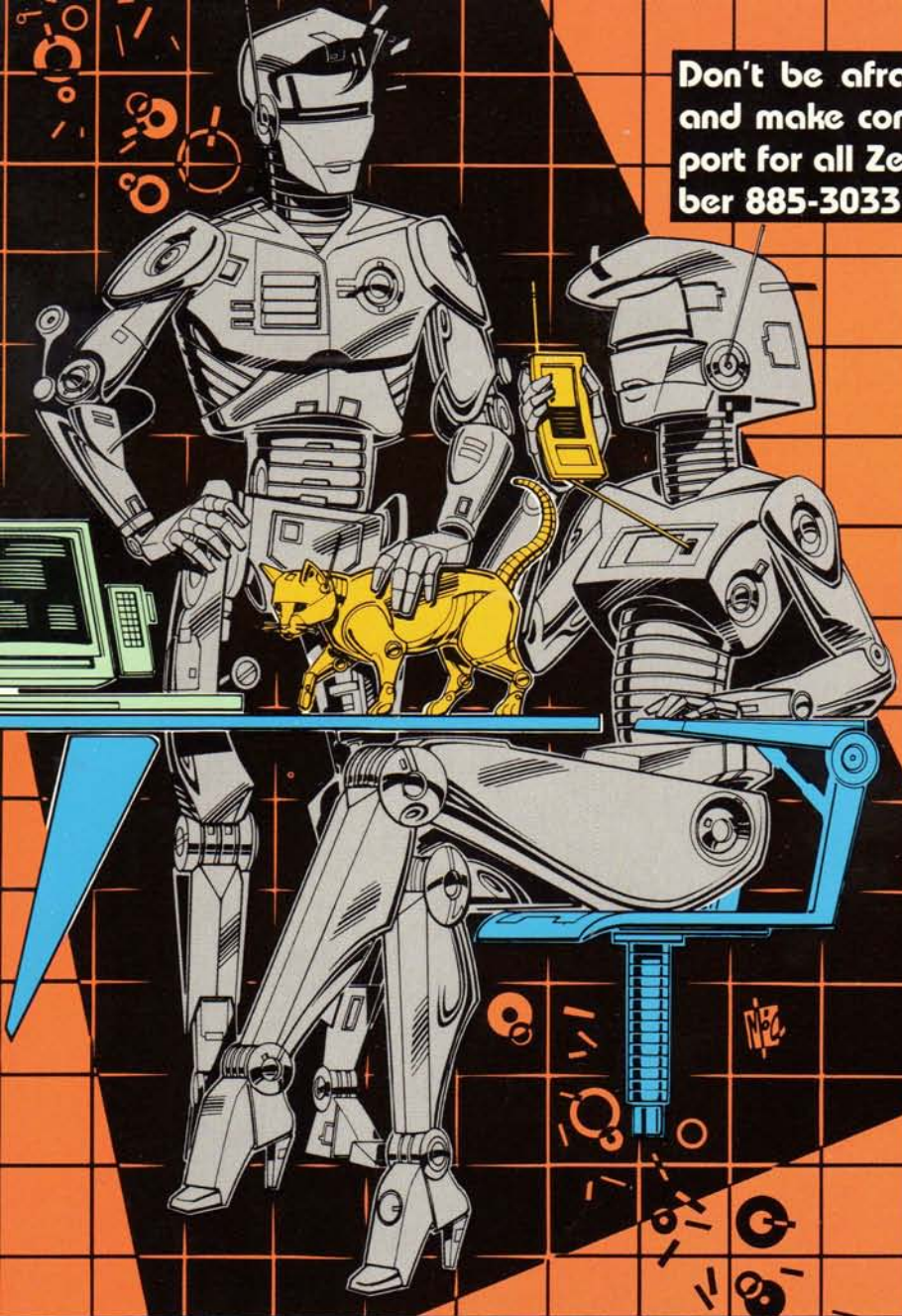


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Don't be afraid to communicate! Get HUGMCP and make contact the easy way. Now with support for all Zenith Laptops, order HUG Part number 885-3033 today.

HUGMCP Commands

- F1 -- Prints This List, Your Storage Buffer Size, And How Many Bytes Are Presently In The Storage Buffer.
- F2 -- Allows Sending A Defined Message, Or Character Sequence. These Messages Are Entered Using The (F5) Setup Command.
- F3 -- Toggles The Storage Buffer On and Off. When The Buffer Is On, The (Ctrl) On The 25th Line Will Be High-Lighted.
- F4 -- Allows Saving Data To Disk From The Storage Buffer, Or Directly From The Modem By Way Of XMODEM Protocol.
- F5 -- Allows Sending Data From Disk, Using Either XON-XOFF, Which Optionally Can Be Ignored, Or XMODEM Protocol.
- F6 -- Enters The Setup Mode So This Software Can Be Configured.
- F7 -- Clears Out Any Data That May Be In The Storage Buffer.
- F8 -- Send Data In Storage Buffer To Printer.
- F9 -- Exits Back To MS-DOS.

Storage Buffer = 524288 Bytes
Storage Buffer Usage = 0 Bytes

Select Message (A-D), (F1) To List, Anything Else To Abort -->

F1-List F2-Msg F3-Bufr F4-Sav F5-Snd F6-Cfg F7-Clr F8-Print F9-Exit CM

HUGMCP Configuration Help #1

- 1. This Function Allows The Baud Rate To Be Changed. Depending Upon Which Mode You're In, Normally It Would Be Set To Either 9600, 19200, Or 38400 Baud. Simply Connect To A Modem. Will Allow Higher Baud Rates.
- 2. This Function Allows You To Change The Word Parity. Normally, you should choose "No Parity". This Is Acceptable By Most Remote Systems, And It Is Also Necessary For XMODEM Protocol To Work Properly.
- 3. This Function Allows The Changing Of The Word Length. Normally The length Should Be Set To 8 Data Bits. This Value Is Acceptable By Most Remote Systems, And It Is Necessary For XMODEM Protocol To Work Properly.
- 4. This Selection Allows You To Enter Messages Which Can Be Automatically Sent With The (F1) Key. Up To 16, 32-Character Messages Can Be Saved. Selection 14 Is Special. It Should Contain Your Login/Password. If Under Any Password, Selection 14 Is Also Special. This Selection Can Automatically Be Sent When This Program Is First Executed By Selecting The Green Arrow During Setup.

Type (SPACE BAR) For More Help, Anything Else To Configure:

F1-List F2-Msg F3-Bufr F4-Sav F5-Snd F6-Cfg F7-Clr F8-Print F9-Exit CM

HUGMCP Configuration Menu:

- A -- Modify Baud Rate
- B -- Modify Parity Type
- C -- Modify Word Length
- D -- Modify Or Add Auto-Messages
- E -- Miscellaneous Functions
- F -- Change Screen Color Assignments
- G -- Display Current Configuration
- H -- Make Changes Permanent

Select A-G, (F1) For Help, Anything Else To Quit -->

Baud Rate: 19200
Parity: NONE
Word Length: 8
Duplex: FULL
Response To Keyboard Disable: NO
Storage Buffer Data Parity Bit: SET TO ZERO
Send Modem Initialization Text: NO
Delete Character: NONE
Modem Port Set To: COM1

F1-List F2-Msg F3-Bufr F4-Sav F5-Snd F6-Cfg F7-Clr F8-Print F9-Exit CM



P.O. Box 217

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